

## **Tropical GRIP Forecast Discussion for September 14, 2010**

Created 1600 UTC September 14, 2010

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### **Summary:**

All three agencies are gearing up for further investigative missions into PGI-44L/AL92, which looks much more organized than it has in previous days, and is expected to become a depression today. WINDSAT imagery is indicating a closed circulation as of 1130 UTC today, and convection in and around the storm is beginning to look much more like a depression typically organizes, so it is hoped that the missions today will confirm this. The PREDICT GV will investigate the storm early in the day, followed by coordinated flights of the NASA DC-8 and the NOAA P3s, and a CARCAH investigation at low levels is expected to provide a center fix at 1800 UTC. Depending on what happens with AL92 over the next 2 days, some agencies may choose to fly the system again when it re-emerges over the Bay of Campeche on Thursday, or may instead choose to fly Hurricane Igor this weekend if that appears to be a better target. Most models forecast AL92 to strengthen over the Bay of Campeche to a Tropical Storm, but there is still a good spread in the model track and intensity prediction for this system after it crosses the Yucatan Peninsula.

### **Forecast for 1600 UTC 9/14/2010:**

### **Synoptic Overview:**

At the surface in the western half of the Atlantic basin today we see the stationary front/surface trough extending across the Gulf of Mexico up to southern Florida and back up to a 1010 hPa low pressure center off the coast of North Carolina (**S1**). There are a few isolated showers associated with this off the west coast of FL, and in the Bay of Campeche (**S2**). The tropical wave associated with PGI-44L/AL92 continues to bring scattered strong convection to the western Caribbean, with an influence seen as far northeast as the southern Bahamas (**S2, S3**). AL92 has a surface pressure of 1006 hPa as of 0900 UTC today, and as of around 0200 UTC Sept 14 (last night) the NOAA P3 flight found evidence of a low level circulation including some marginal 5 kt westerly winds. TPW imagery (**S4**) also shows abundant Gulf of Mexico and Caribbean low-level moisture except for a slot of dry air ahead of AL92 and over the Virgin Islands.

The upper level environment in this half of the basin is dominated by an upper level anticyclone over the northern Gulf coast, an upper level trough over the Yucatan Peninsula, a weak upper level anticyclone over the central and eastern Caribbean, and the jet associated with the frontal system exiting the US east coast (**C1**). Dry air is also

abundant at upper levels north of 23N and in the east Caribbean (**S6**). Of note, wind shear is also very low over the Gulf and Caribbean (**C2**).

In the central Atlantic we see the 1029 hPa ridge retreating to the east with the eastward movement of a mid latitude trough, providing a weakness to the west whereby Igor can recurve to the northwest and Julia can begin to follow (**S1, I4**). This morning Igor is a category 4 storm with a 945 hPa minimum central pressure and maximum sustained winds of 115 kts, headed WNW at 6 kts. Julia was upgraded this morning to a category 1 hurricane with a 984 hPa minimum central pressure and winds of 75 kts headed WNW at 10 kts. A significant slot of dry air is present ahead of Igor and to the NE of Julia (**S4**), with marginal dry air sandwiched between Igor and Julia. Wind shear to the NE and East of Igor is moderate to strong, but just ahead of Julia the shear is lower (**C2, C8**).

The East Atlantic still has an upper level cold low present off of Spain and an upper level anticyclone over NW Africa (**C5**), and easterly flow further south of that extends west from West Africa to south of the Cape Verde Islands (**C9**). At lower levels, PGI-45L is fairly far south compared to previous waves, and is located near 8N, 10W at 0000 UTC today and expected to exit the coast over the next day. ITCZ convection is present between 5N and 10N, and low level monsoonal moisture is feeding the convection over West Africa associated with each easterly wave transitioning through that region (**C7**).

### **Features of Interest:**

#### **PGI-44L...AL92**

The CIMSS pouch position analysis places the center of PGI-44L at 17.9 N and 81.8 W at 1200 UTC. Both visible and water vapor satellite imagery suggests the convection associated with this system is becoming better organized this morning, having lost its bimodal characteristics from yesterday (**44A, B**). Also, CIMSS overshooting top analysis indicates an increasing number of OTs, indicating an increase in convection within the system (**44C**). MIMIC TPW (**S4**) imagery shows that the dry air entrainment from yesterday has diminished, aiding the increased convection. Furthermore, the low level vorticity has increased substantially since yesterday, and an 1130UTC WINDSAT pass indicated the presence of a closed circulation (**44D, E**). PGI-44L remains over very warm SSTs (**44F**) and within a region of low wind shear (**C2**). Given the environment, increase in vorticity, and the presence of a closed circulation, the probability of tropical cyclogenesis within the next is very high.

Most of the 0600 UTC model guidance suggests that the system will develop into at least a tropical depression over the next few days, though they don't completely agree on the pace of that strengthening. Some models indicate PGI-44L will reach TS strength in 24-36 hours, however several dynamical models keep it as a tropical depression (**44G**). There is better agreement for the system track, at least in the short term. All models track the system west-northwest for the first 36-48 hours, across the Yucatan Peninsula (**44H**). After this, there is some discrepancy with some models bringing the system west northwestward and others turning the system to the SW. This greatly influences the time

spent over the Bay of Campeche. A northerly track will allow for more strengthening than a southern one. Regardless of the exact track, strengthening is anticipated given the favorable environment, and even rapid intensification cannot be ruled out.

Favoring the ECMWF and GFDL, the expected track after emergence into the Bay of Campeche is generally westward, however the exact landfall point in central Mexico remains highly uncertain.

*Initial position:* 1200 UTC Sept 14: 17.9N, 82.3W

12 hours: 0000 UTC Sept 15: 18.2N, 84.5W

24 hours: 1200 UTC Sept 15: 19.0N, 87.0W (Wed. morning landfall on Yucatan)

36 hours: 0000 UTC Sept 16: 19.9N, 88.5W

57 hours: 2100 UTC Sept 16: 21.0N, 92.0W (Thursday possible flight in AL92)

#### **PGI-41L...Igor:**

After dropping to an estimated minimum central pressure of 933 hPa with estimated maximum sustained winds of 130kts, Igor has weakened slightly today. Late yesterday, Igor began an eyewall replacement cycle, allowing the system to weaken overnight. The estimated central pressure is now 945 hPa, and maximum sustained winds are estimated to be 115 kts. The eye remains well developed with a diameter of 20 nm. As of 1245 UTC, Igor is centered at 18.4N/52.1W (**I1**) and has turned to the WNW at a heading of 285 degrees moving at approximately 7 kt. Shear over the system has remained relatively persistent over the past 12 hours with 5-10 kt shear over the eastern portion of Igor (**C2**). The CIMMS 24 hour shear tendency analysis indicates that shear has decreased ahead of the storm today (**I2**).

The model intensity forecasts (**I5**) reflect a slight decrease in the maximum sustained winds down to category 3 intensity, however, the official forecast maintains Igor as a category 4 hurricane for the next several days. Because Igor is completing an eyewall replacement cycle, and the environment is favorable, it seems unlikely that Igor will weaken further in the near future. After 24 hours, the models forecast a slight reintensification, and the NHC forecast mirrors this with an intensity forecast of 120 kt after 36 hours. After 48 hours, there is a general consensus that Igor will begin to weaken as the storm encounters some higher wind shear that is a result of a deep trough digging south off of the east coast of the United States. The weakening of Igor could be slower as the SHIPS forecasted shear values (**I3**) are not that great and other environmental conditions (SSTs, ocean heat content, etc.) suggest that Igor should remain a well organized, major hurricane for at least another 72 hours. After 72 hours, the shear forecast begins to increase, weakening the system. The NHC 72 hour forecast is for the storm to weaken to 90 kt, but it may be somewhat excessive given the environment outlined in SHIPS.

The model forecast tracks (**I4**) for Hurricane Igor agree that the storm will follow a west-northwest track for the next several days with a gradual turn to the north along the weakness in the subtropical ridge (**C9**). Today's global model forecasts indicate a slightly westward track relative to yesterday, and are closer to yesterday's ECMWF forecast. This may bring Igor within range of Ft. Lauderdale and Tampa. After 72 hours,

Igor is forecast to continue recurving and approaching Bermuda. Eventually, Igor will interact more rigorously with the trough and begin extratropical transition. Hurricane Julia could have some impact on the forecast track beginning at about 96 hours.

The forecast track for Igor, once it gets within range, is as follows:

2100 UTC Thursday: 22N/59.5W  
2100 UTC Friday: 25N/62.5W  
2100 UTC Saturday: 29N/65W

#### **PGI-43L...Julia:**

As of 1200 UTC, Hurricane Julia is centered at 16.2° N, 29.5° W, or about 600 km west of the Cape Verde Islands. Julia has been moving to the WNW over the past day and is currently maintaining a WNW motion at 19 km/hr. Intensity has increased to 75 kts as of 1200 UTC which represents a substantial jump over the past 24 hours, as the storm has intensified from a weak TS into a category 1 hurricane. The latest IR satellite imagery shows that Julia has grown in size and developed well-defined spiral bands (**S7**). The deepest convection remains displaced to the south of the center, although the convection is beginning to wrap around and form an eye. However, Julia has probably reached its maximum intensity and is beginning to interact with a trough to the north (**S1**) which is causing deep layer wind shear of 20-40 kts (**J1**). In addition, TPW analysis (**S6**) shows dry air to the west of Julia with the pouch taking on an elongated SW-NE appearance.

The 0600 UTC models are in good agreement that Julia will turn more to the NW today and maintain a NW motion through 96 hours (**J2**). The majority of the models keep Julia's intensity around 75-85 kts over the next 36 hours before gradually weakening the hurricane after 72 hours (**J3**). Slight intensification is possible over the next 24 hours as Julia moves over warmer SSTs with temperatures around 28°C (**J4**). In addition, water vapor imagery (**J1**) indicates that dry air on Julia's NW side has not yet entrained into the circulation. Beyond 36 hours, Julia will move over cooler SST values of 25-26°C, while increased interaction with the mid/upper-level trough will further increase wind shear. Julia's long-term prospects become increasingly dim as the cyclone is expected to be further sheared by Igor's extensive outflow beyond 96 hours.

#### **PGI-45L:**

PGI-45L has progressed west-northwestward to 7.5N, 9.5W today. Convection continues to be associated with the pouch in the area, however it is displaced eastward from the center of the pouch. The low level vorticity is also displaced from the pouch center, with maximum values to the north and south (**45A**). Pouch tracking is fairly consistent with yesterday's forecast. The system is expected to move to the west for the next several days, maintaining itself (**45B**). The NOGAPS model brings the system north, however it has not had much success this year with African Easterly Wave tracks near Africa, so confidence in this track is low. Today, the GFS does indicate some

strengthening by 120 hours, however this is enhanced by an interaction with ITCZ vorticity. While such an interaction is difficult to predict 5 days in advance, pouch tracking indicates the environment will be somewhat conducive for development, and tropical cyclogenesis within the next week is a definite possibility. The system will continue to be monitored.

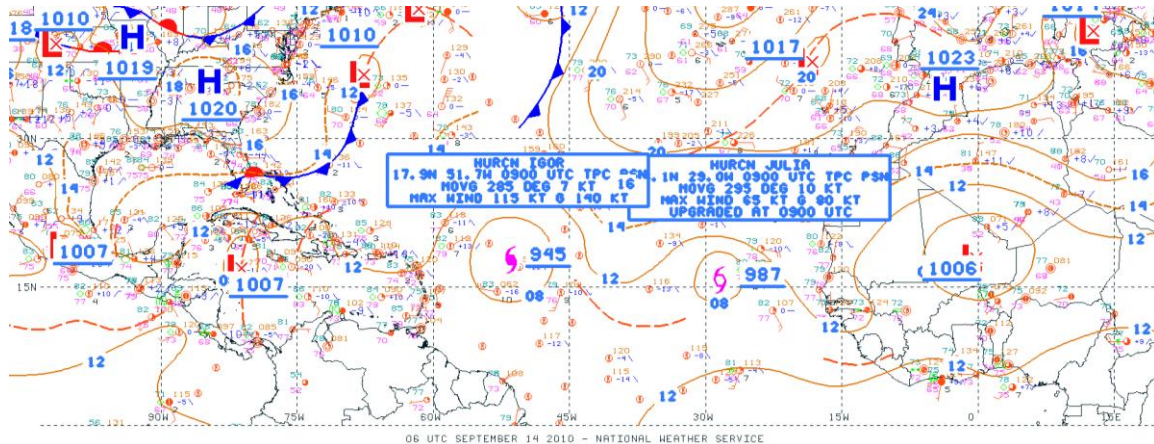
### **SAL/Dust:**

Currently, there is a large area of dry area to the west of Hurricane Igor and another area along the north side of Hurricane Julia (**D1**). These areas do not seem to be strongly linked to the SAL, however there are indications of dust ahead of Julia in the GEOS-5 model analysis today, as well as AQUA and TERRA Aerosol Optical Thickness observed values (**D2, S5**). The dust seen in the GEOS-5 does appear to be wrapping around Hurricane Julia at low levels (**D2**). The GEOS-5 forecast indicates a new dust outbreak will emerge from the North African coast in the next 24 to 36 hours (**D3**). This should have little to no interaction with Julia in the short-term, but it may play a role in the development of PGI-45L in the next 3-5 days.

*Forecasters: English, Zelinsky, Zagrodnik, Tao, Kofron, Wood, Leary, Stovern*

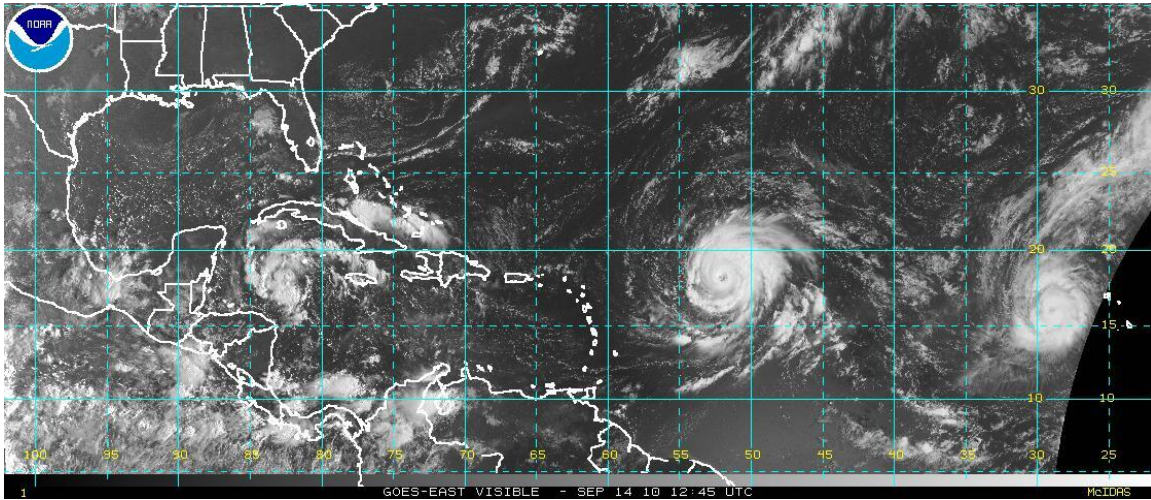
## Images used in discussion:

S1

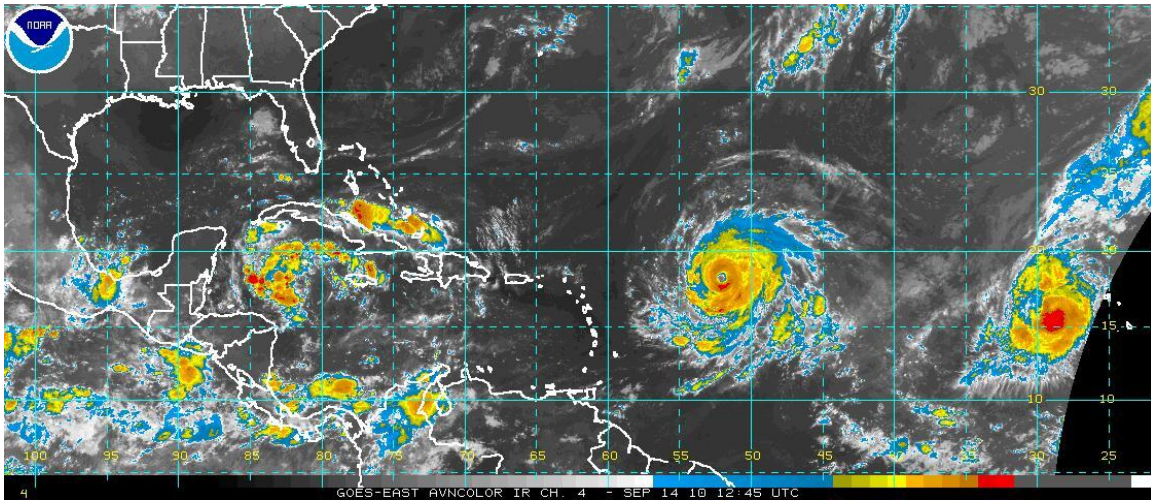




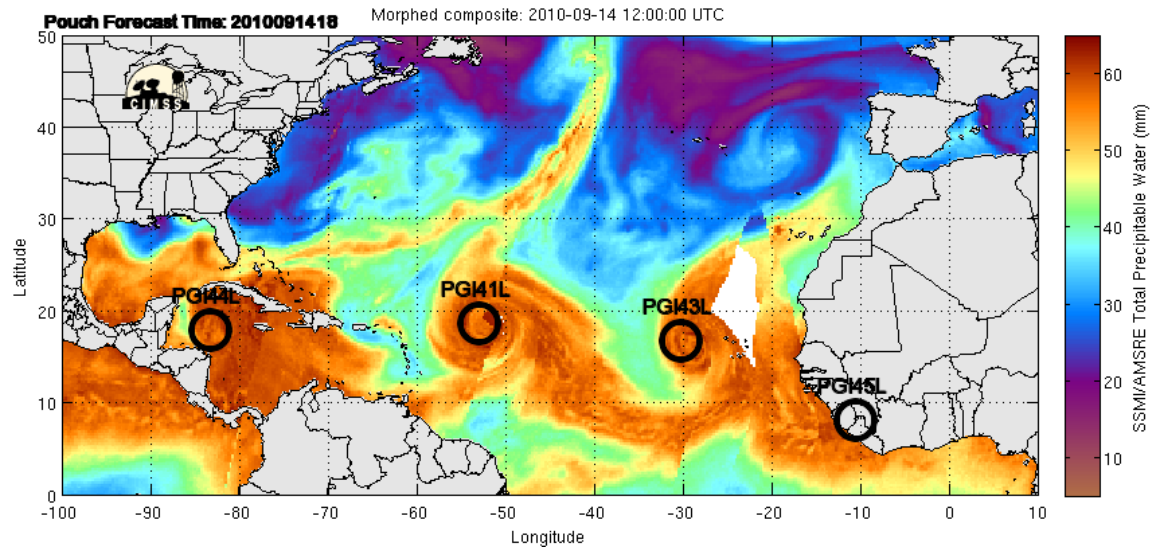
## S2 GOES Visible



## S3- GOES IR



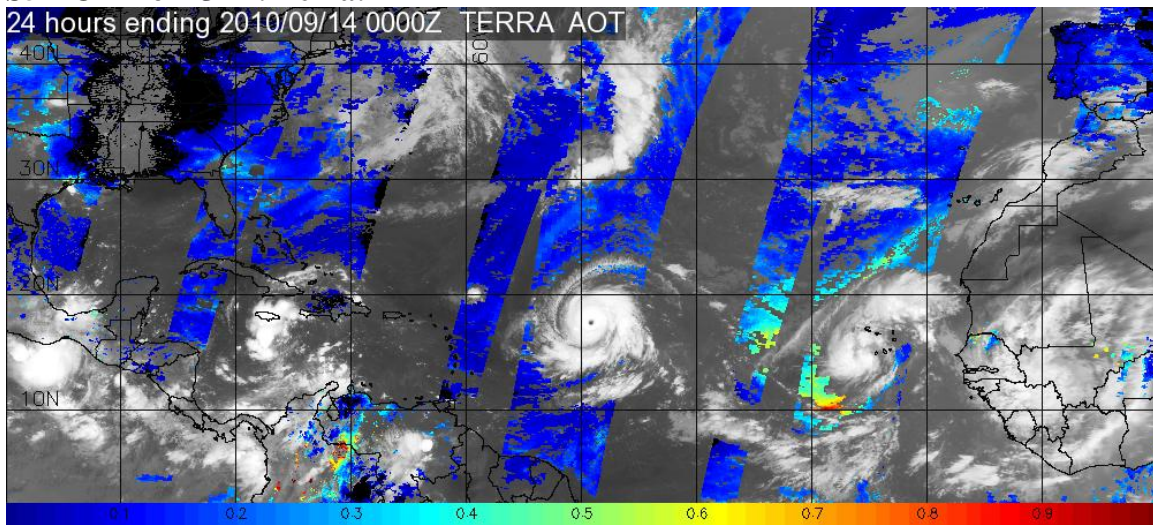
## S4- CIMSS TPW with Pouch Positions



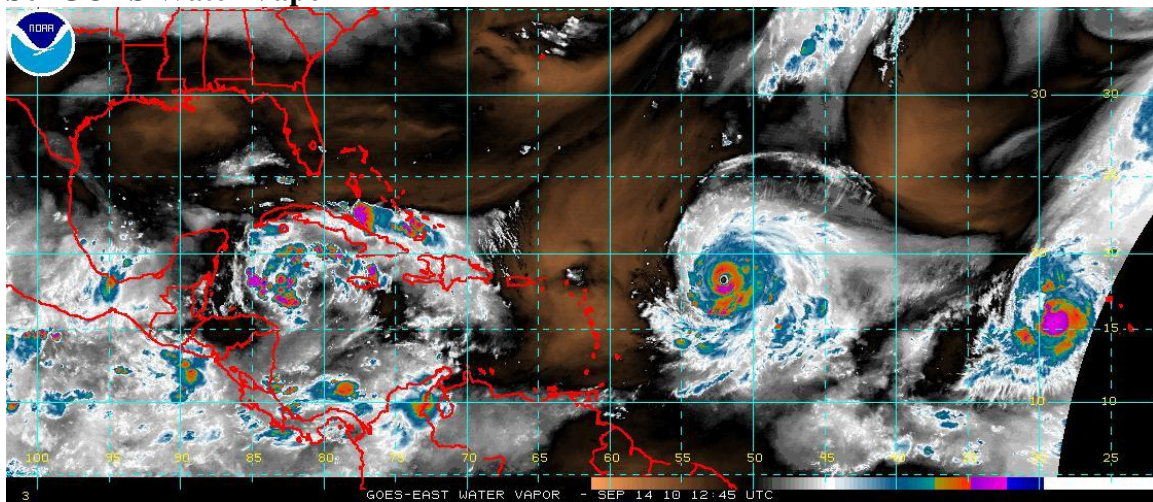


### S5 AOT from JPL: Terra:

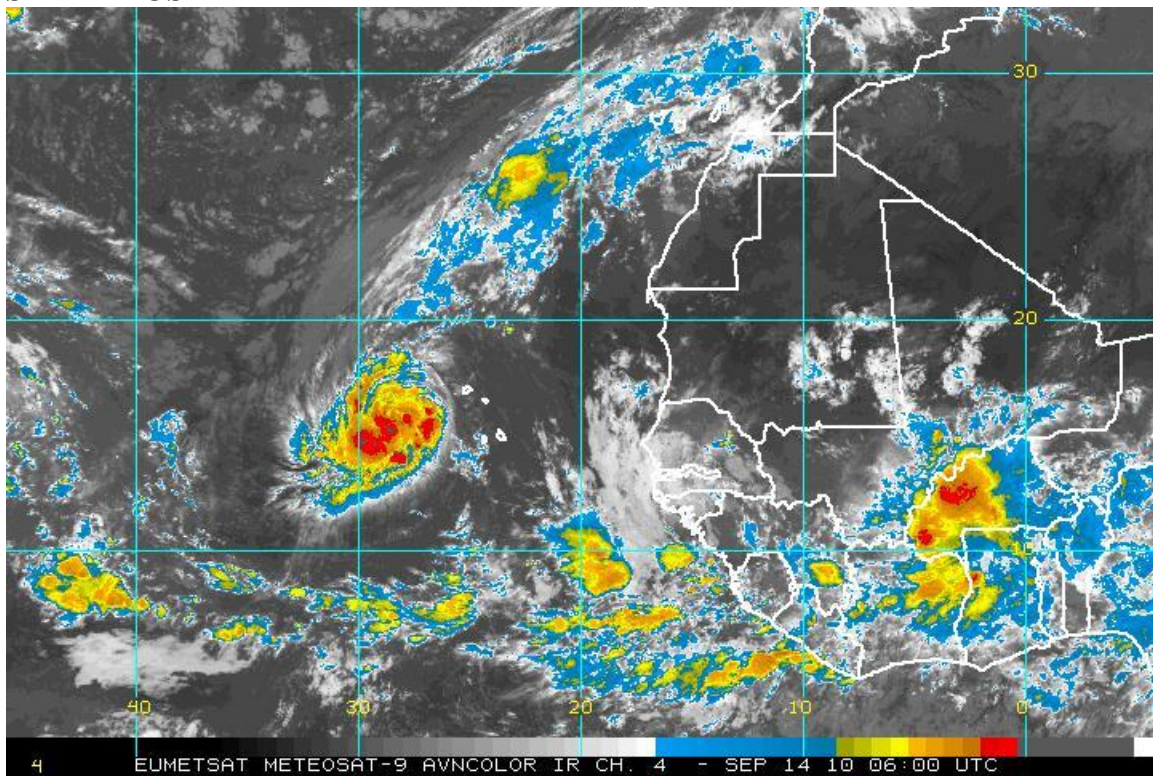
24 hours ending 2010/09/14 0000Z TERRA AOT



### S6- GOES Water Vapor



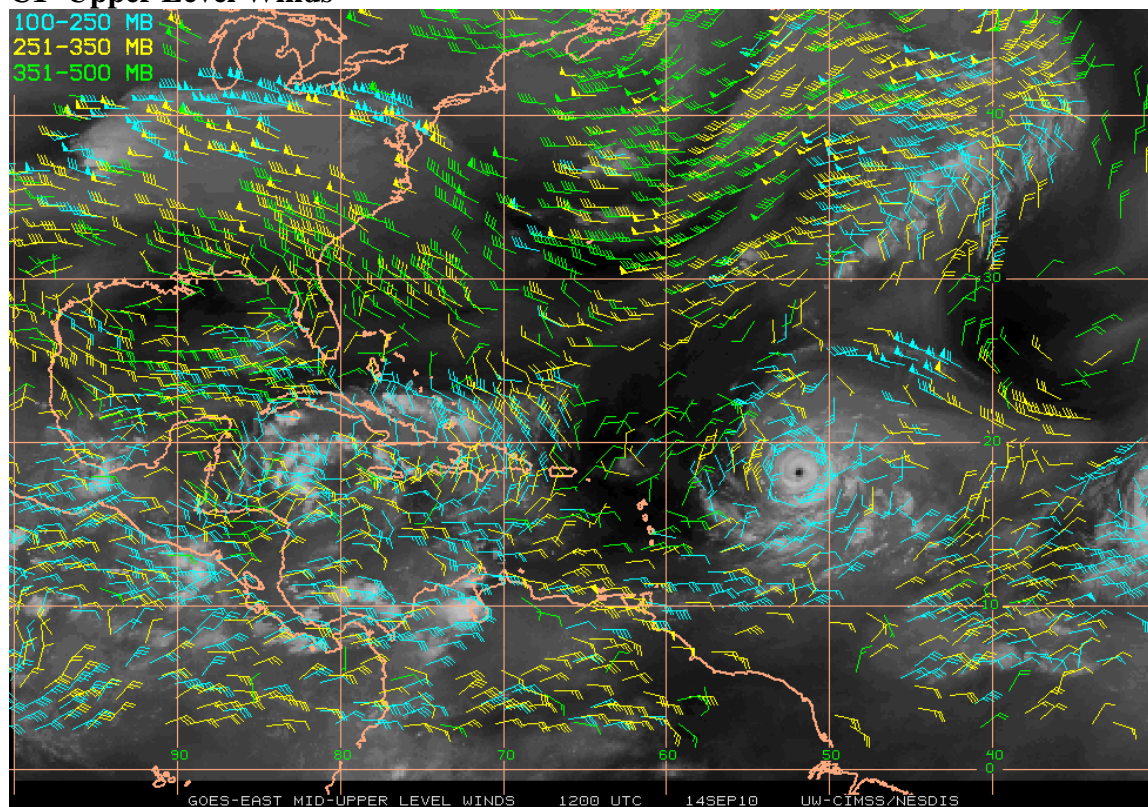
## S7 METEOSAT IR



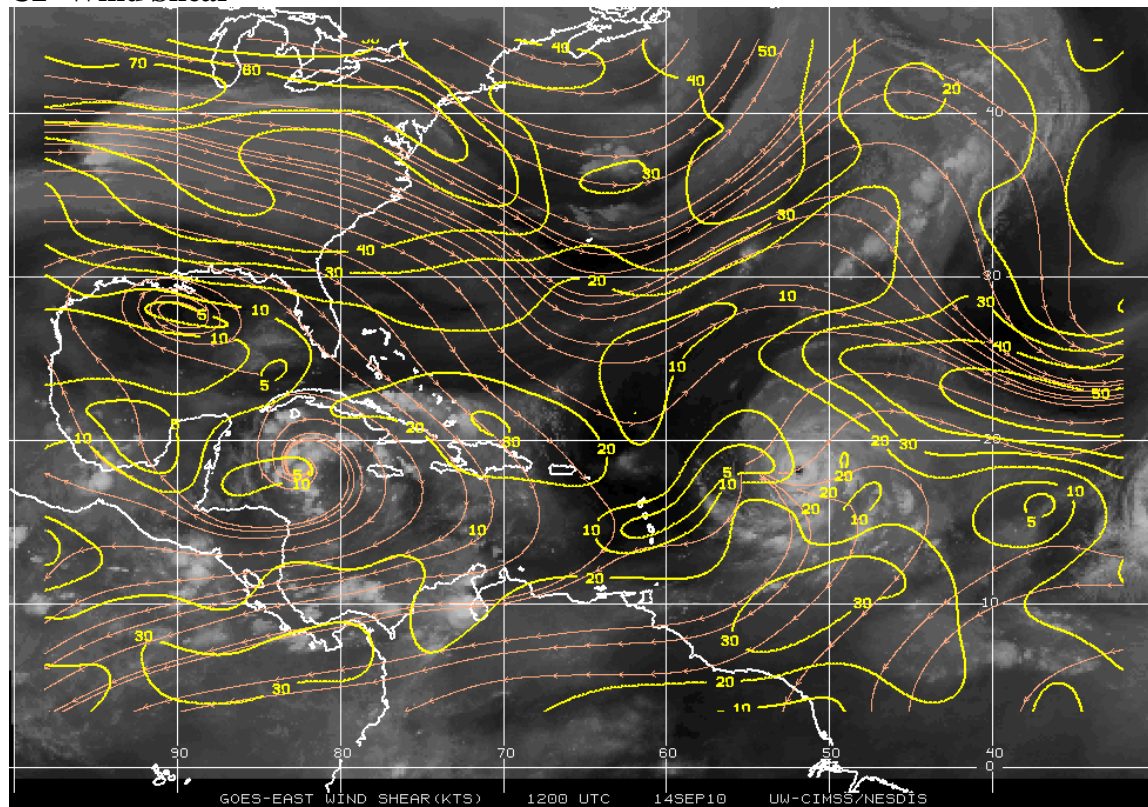
## CIMSS Analyses:



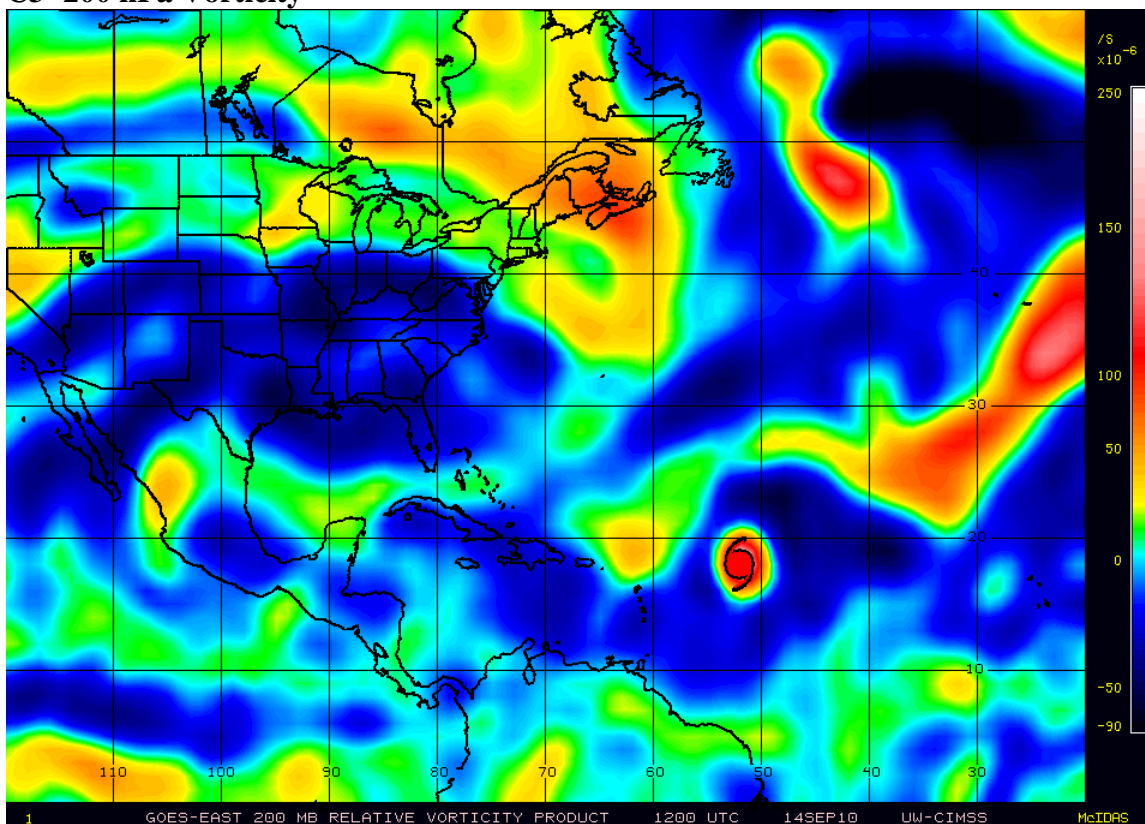
## C1- Upper Level Winds



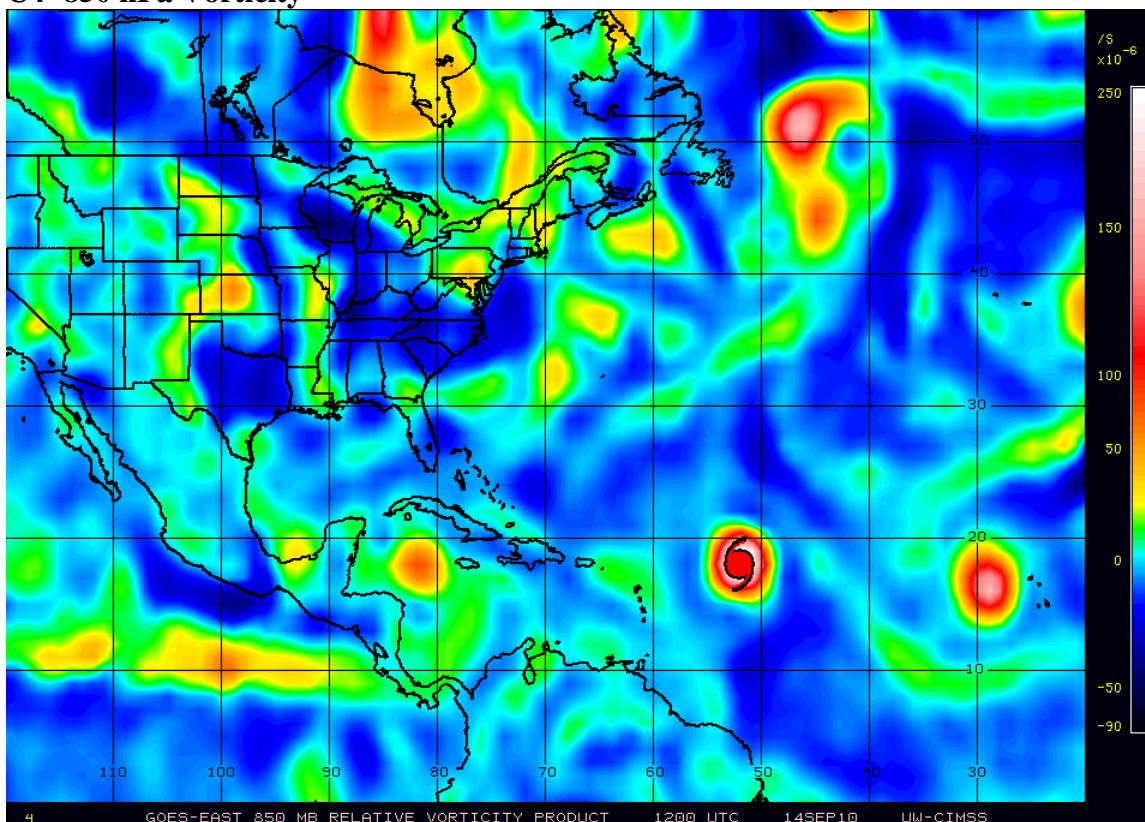
## C2- Wind Shear



**C3- 200 hPa Vorticity**

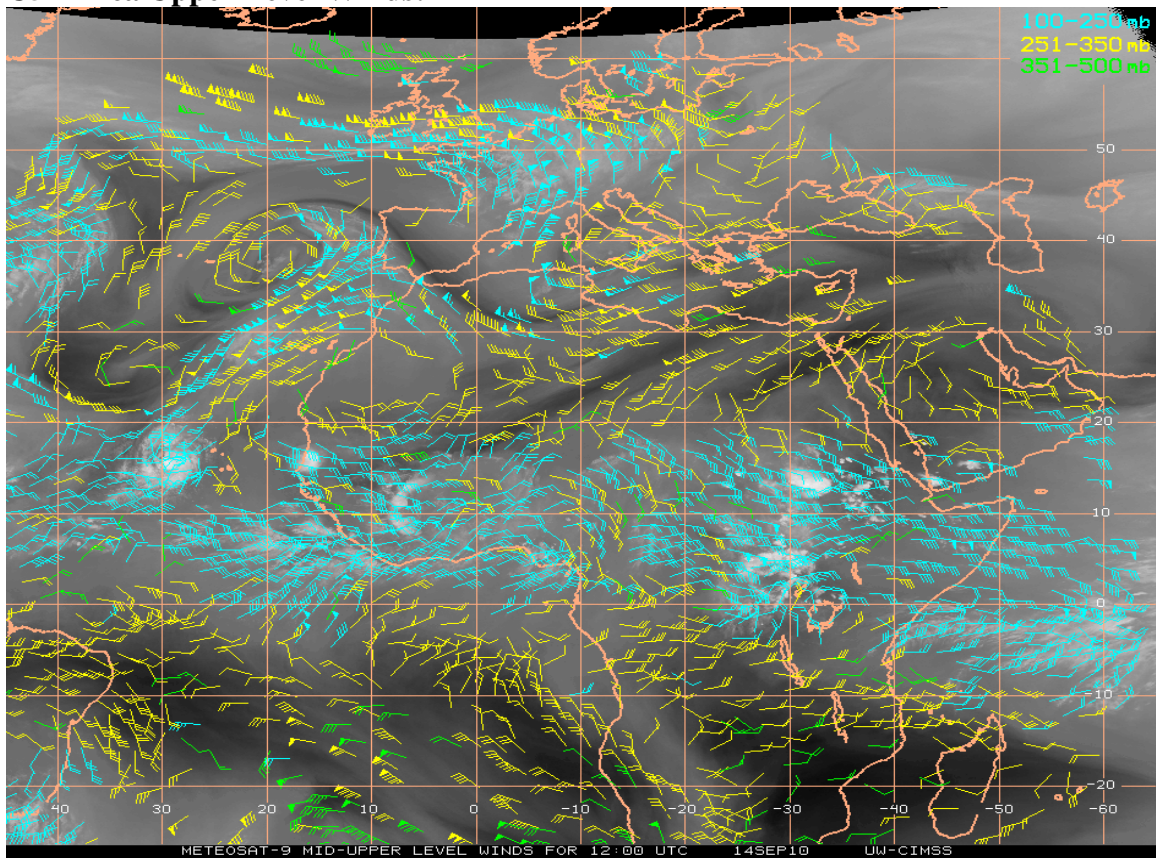


**C4- 850 hPa Vorticity**

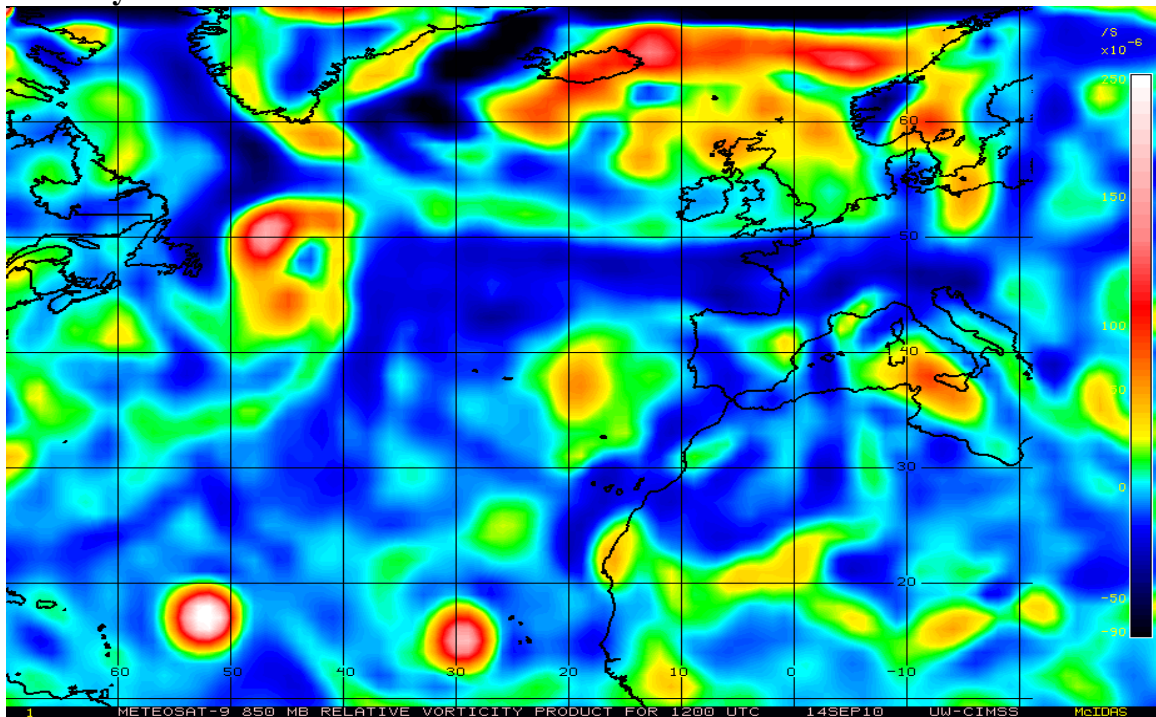




### C5 Africa Upper Level Winds:

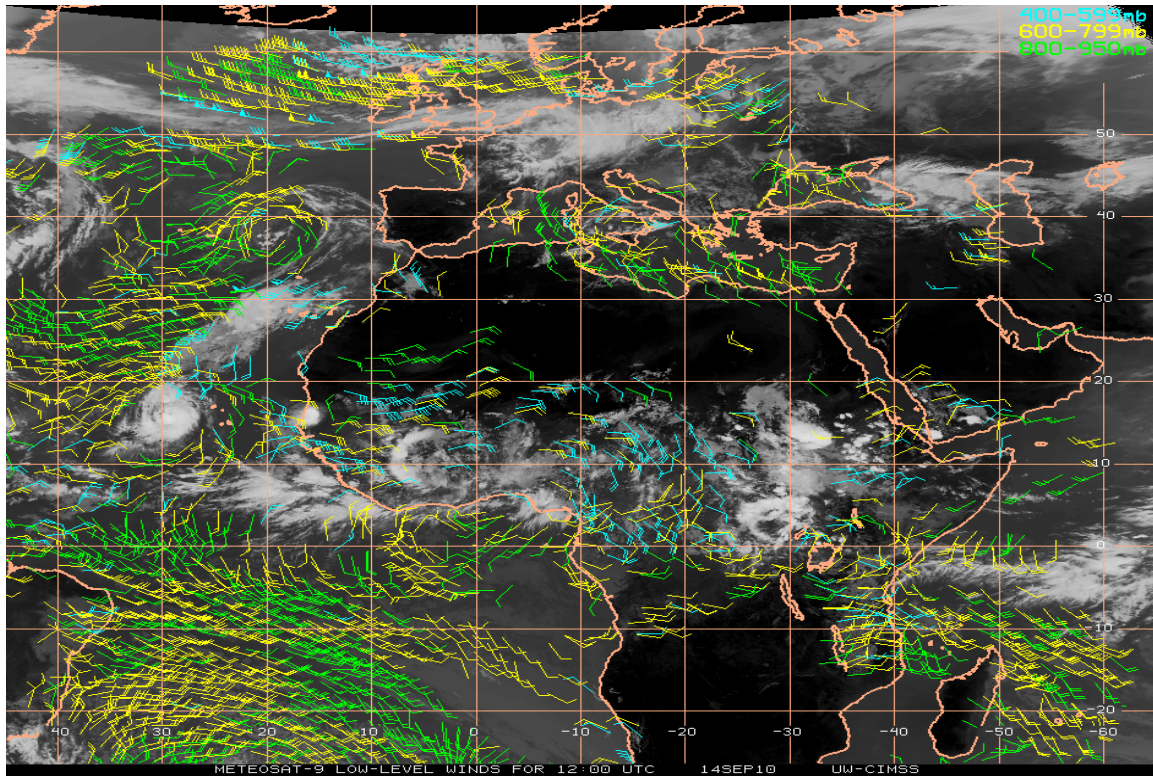


### C6 Africa Lower Level Vorticity

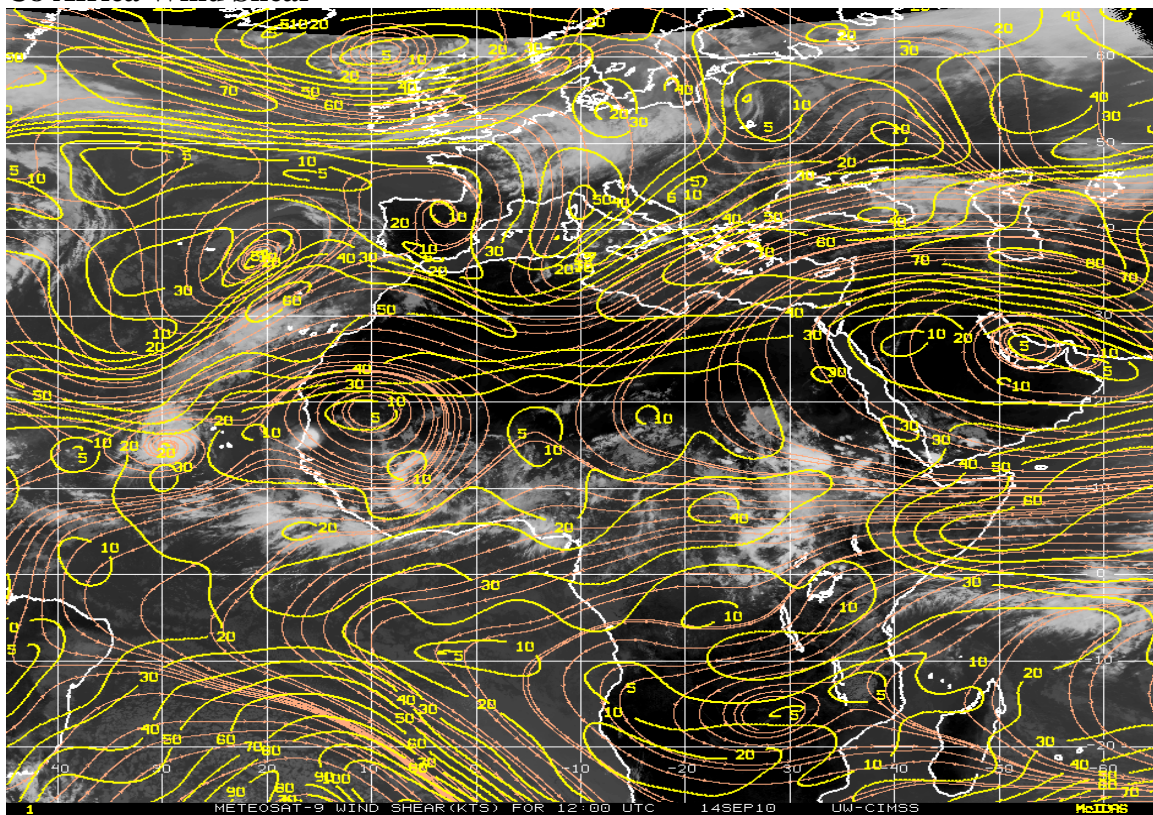




**C7 Africa Lower Level Winds**

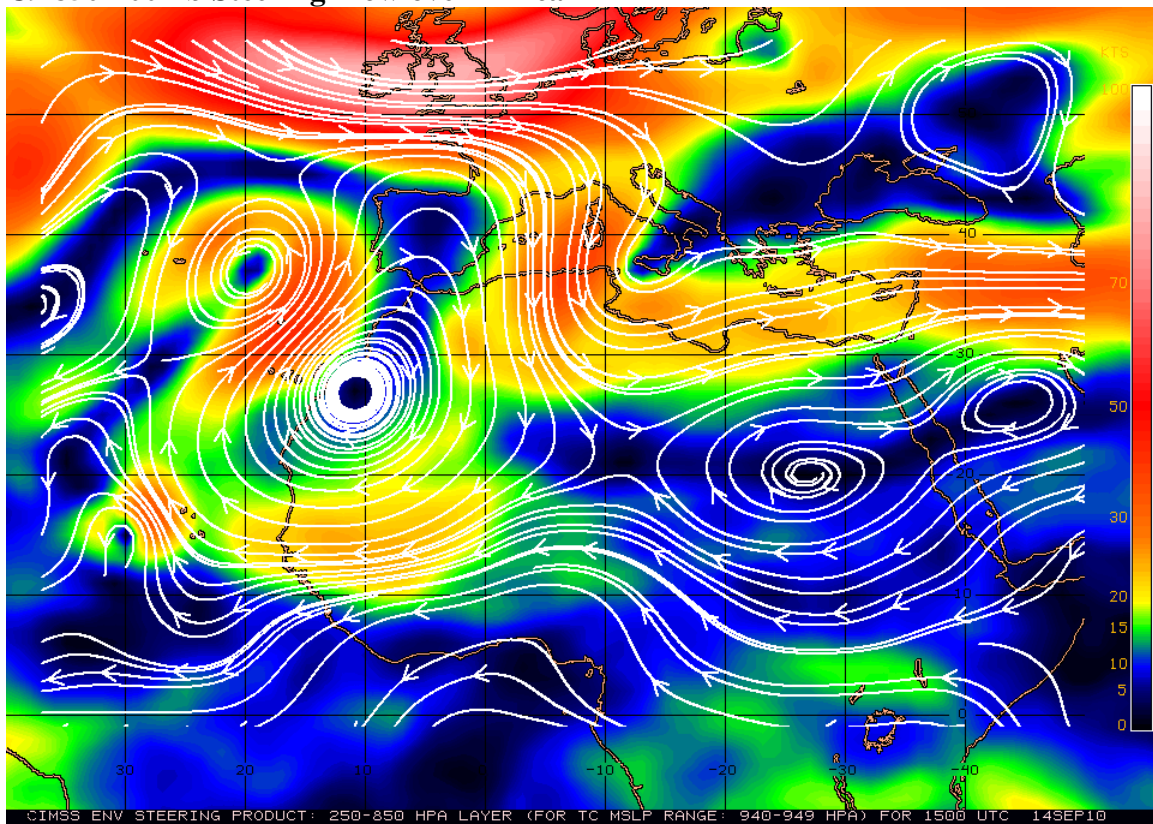


**C8 Africa Wind Shear**



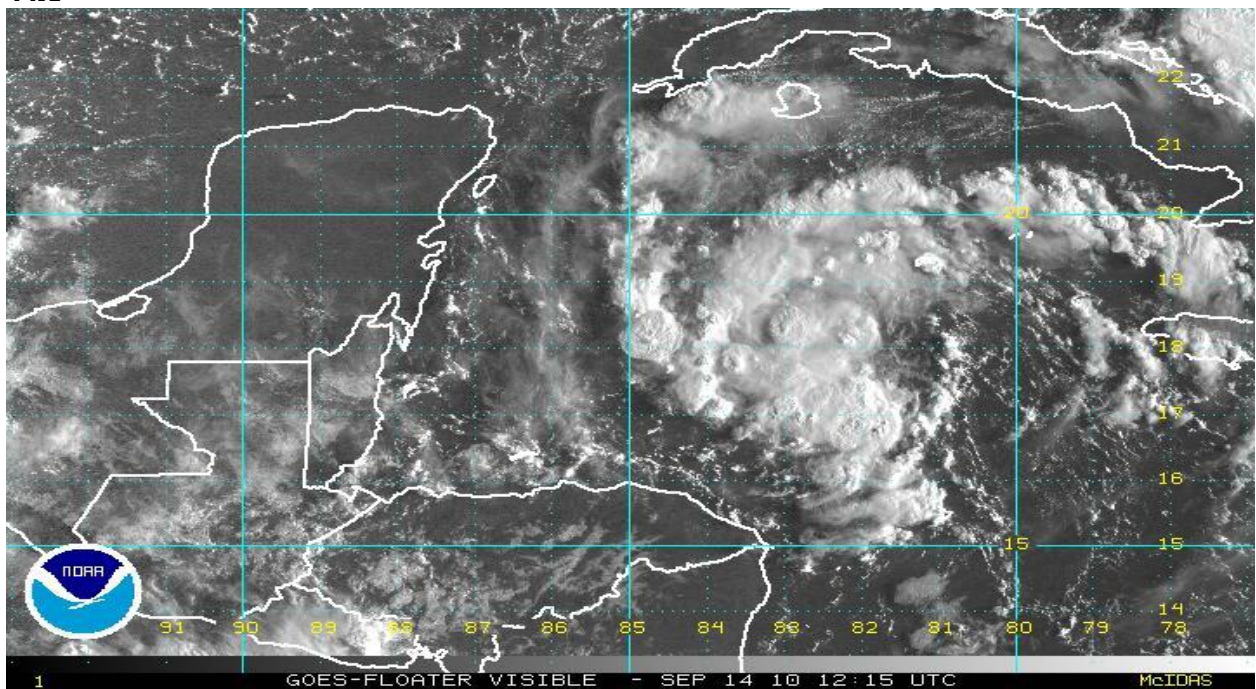


### C9 850-200mb Steering Flow over Africa

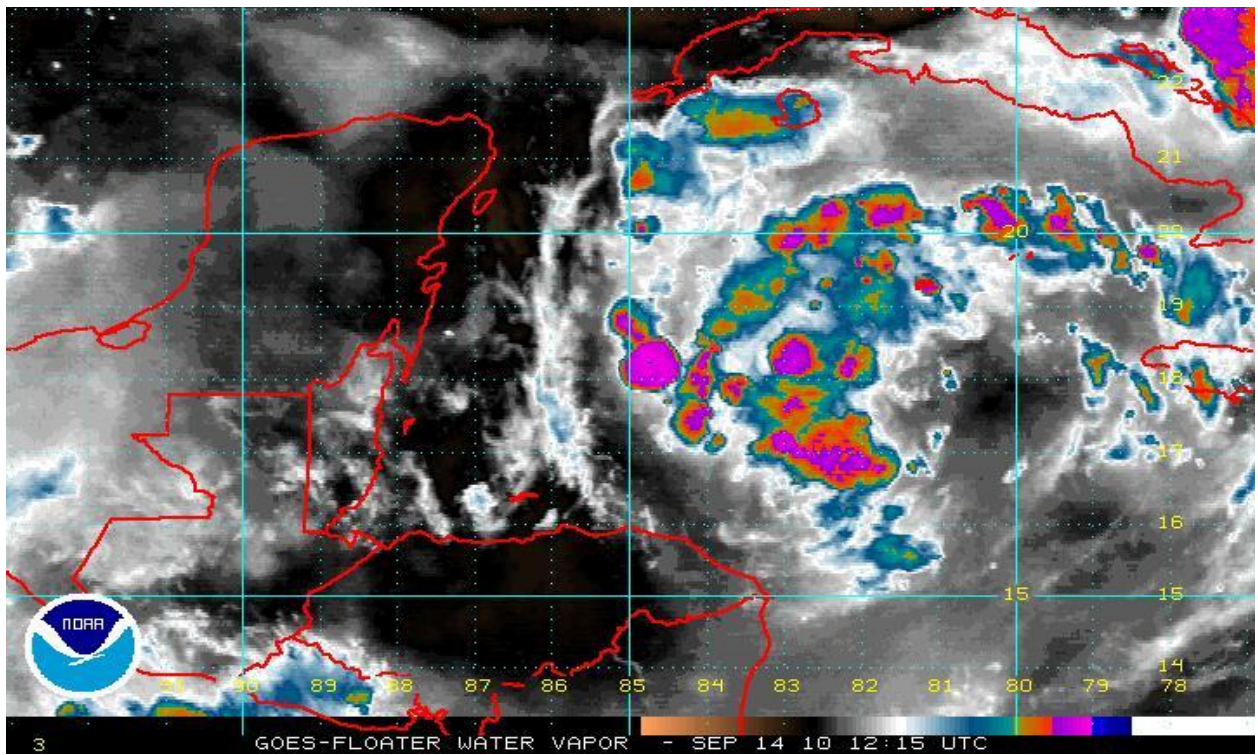


### PGI-44L / AL92:

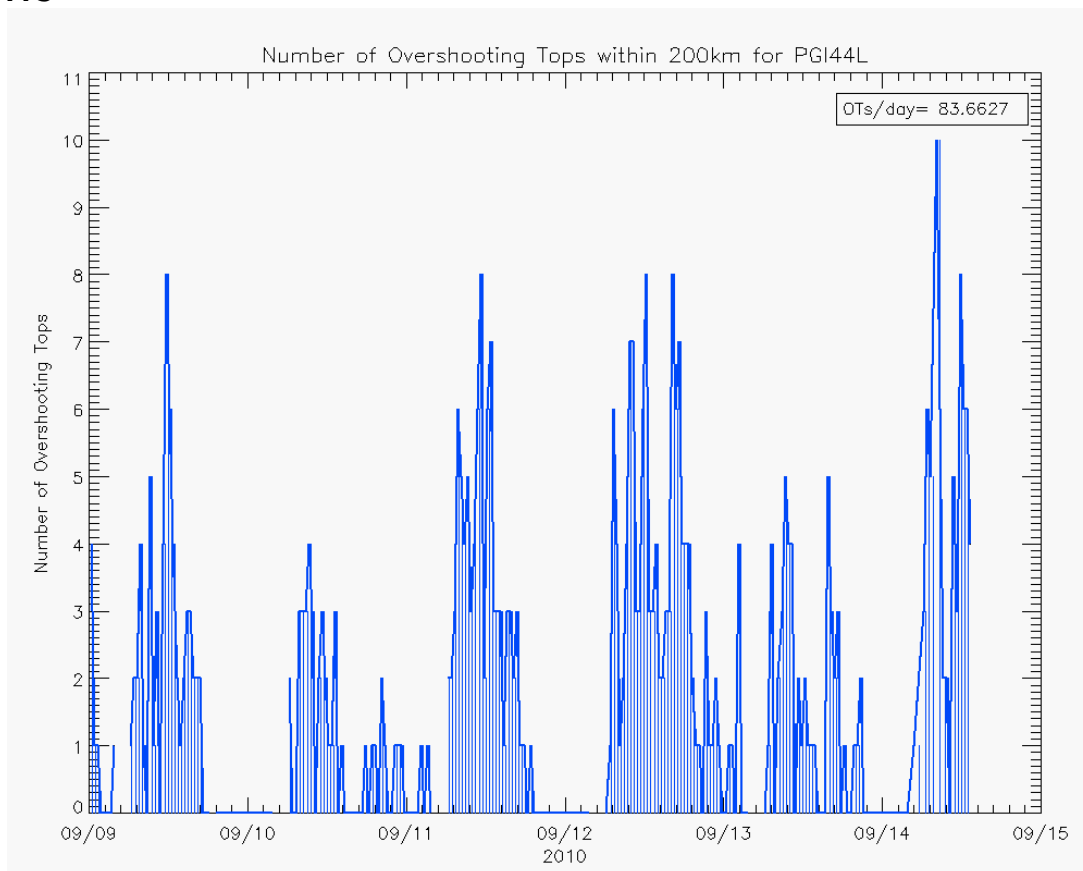
44A



44B

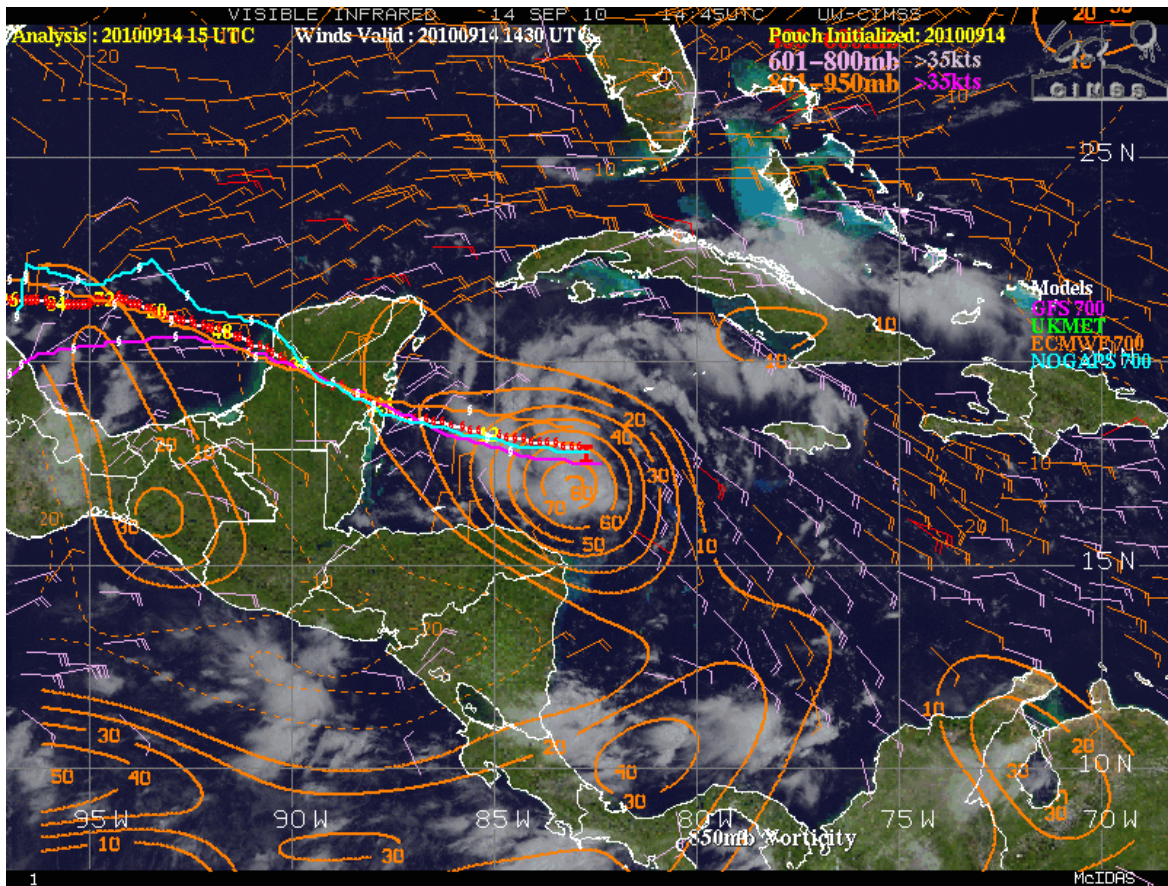


44C

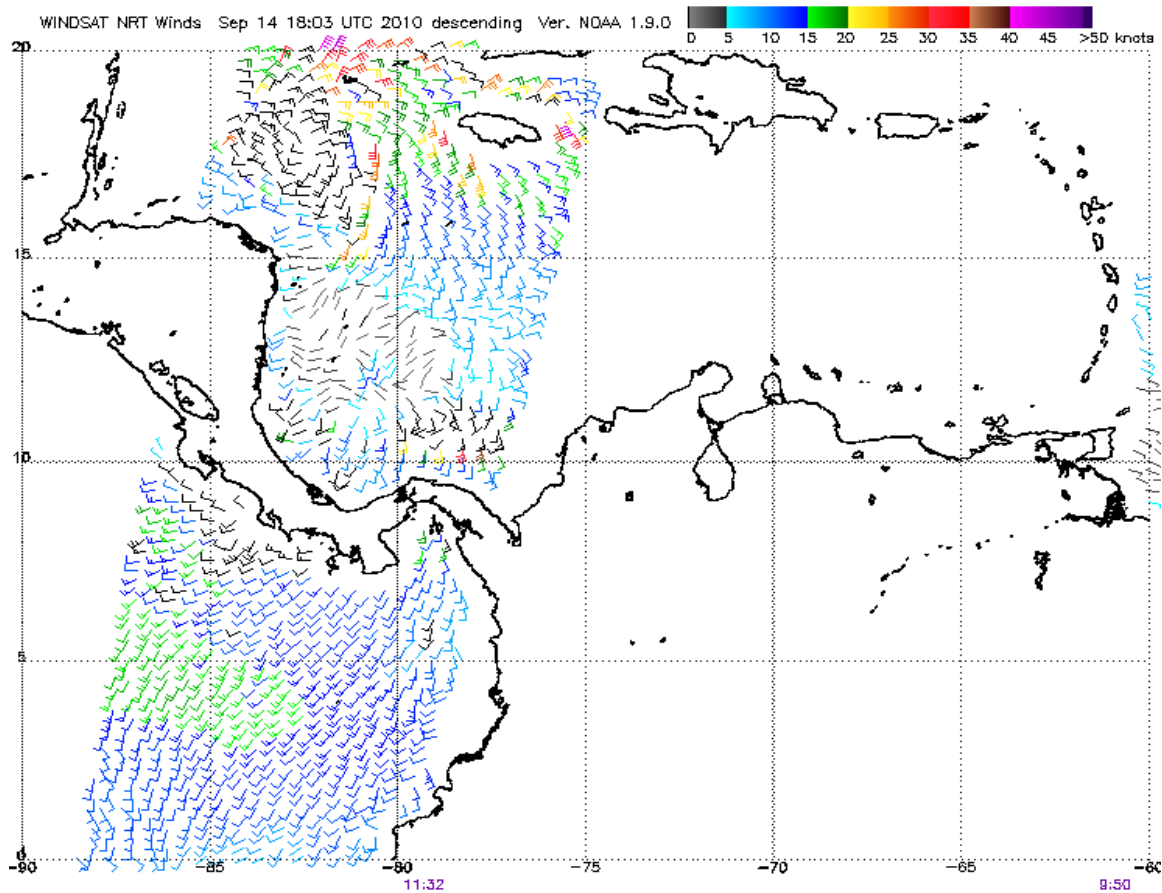




44D

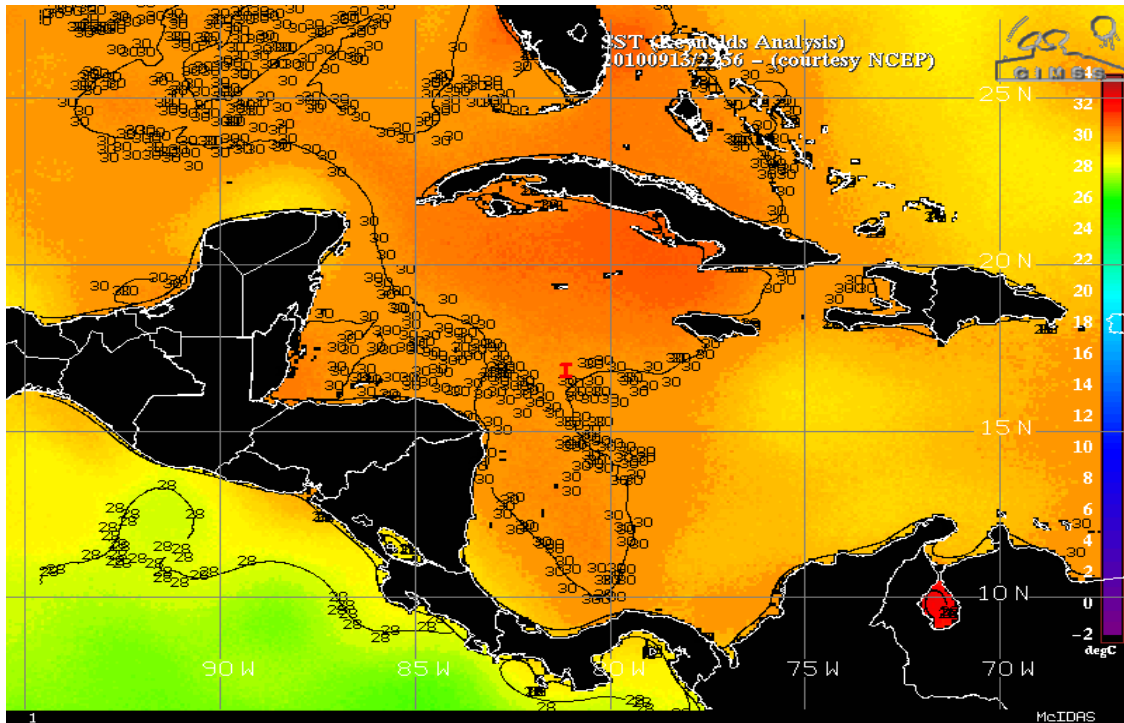


44E

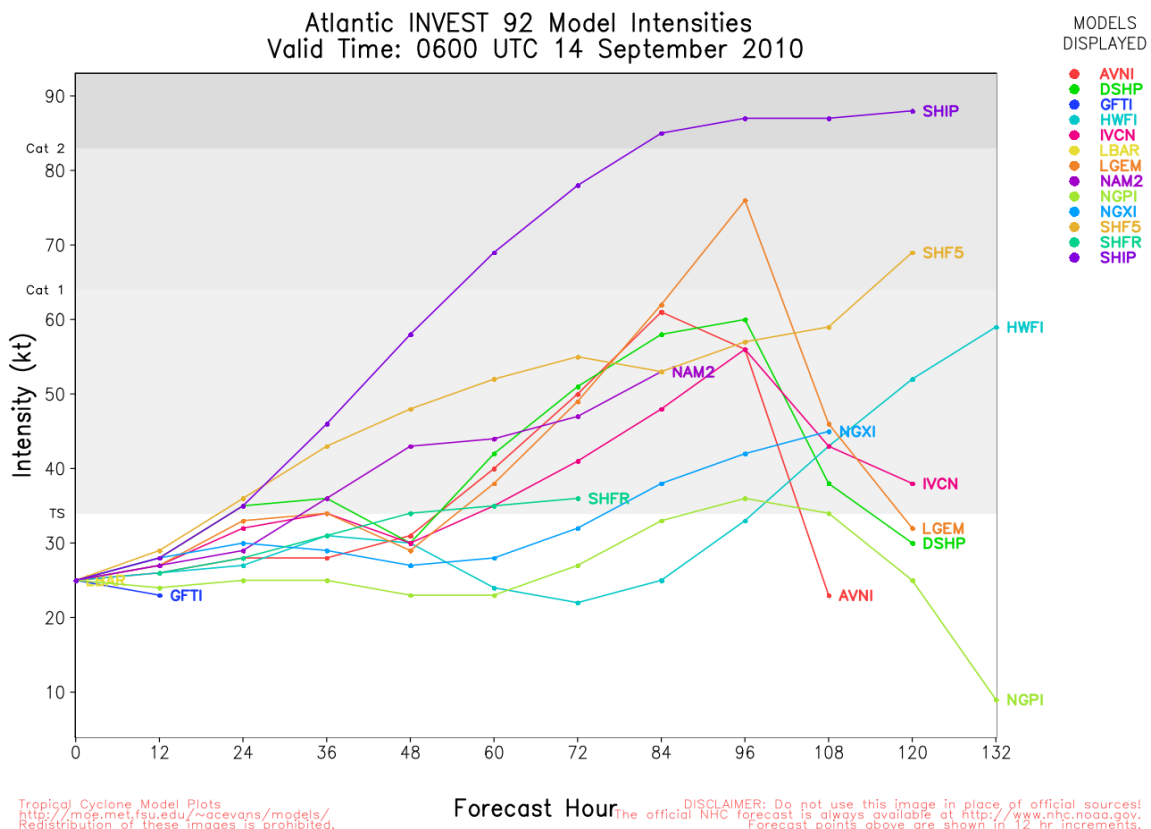


Note: 1) Times are GMT 2) Times correspond to 10N at right swath edge - time is right swath for overlapping swaths at 10N  
3) Data buffer is 22 hrs for Sep 14 18:03 UTC 2010 4) Black barbs indicate possible rain contamination  
NOAA/NESDIS/Office of Research and Applications

44F



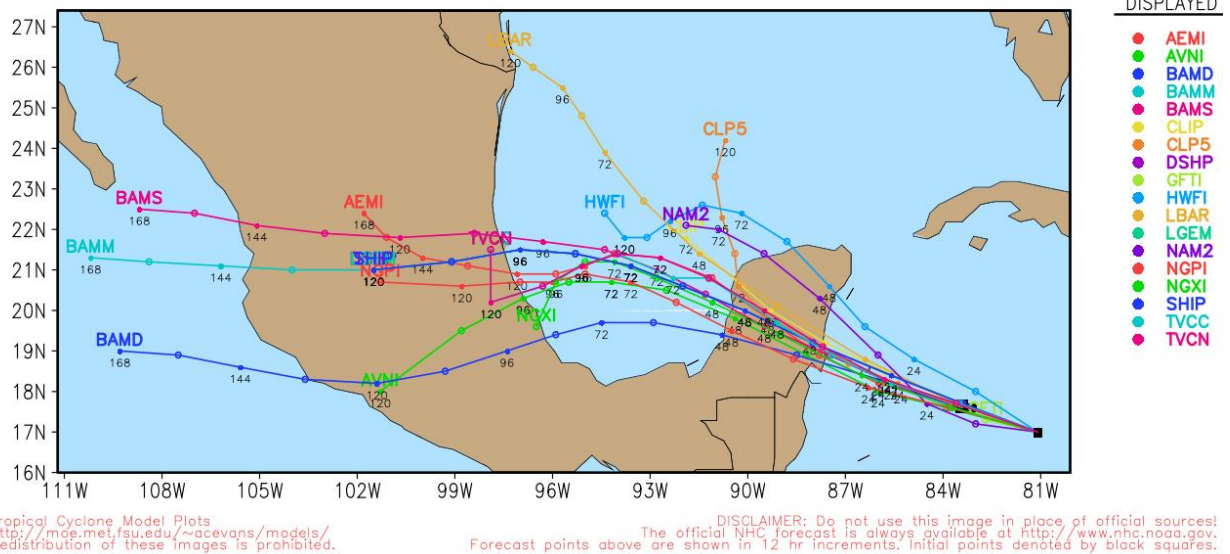
44G





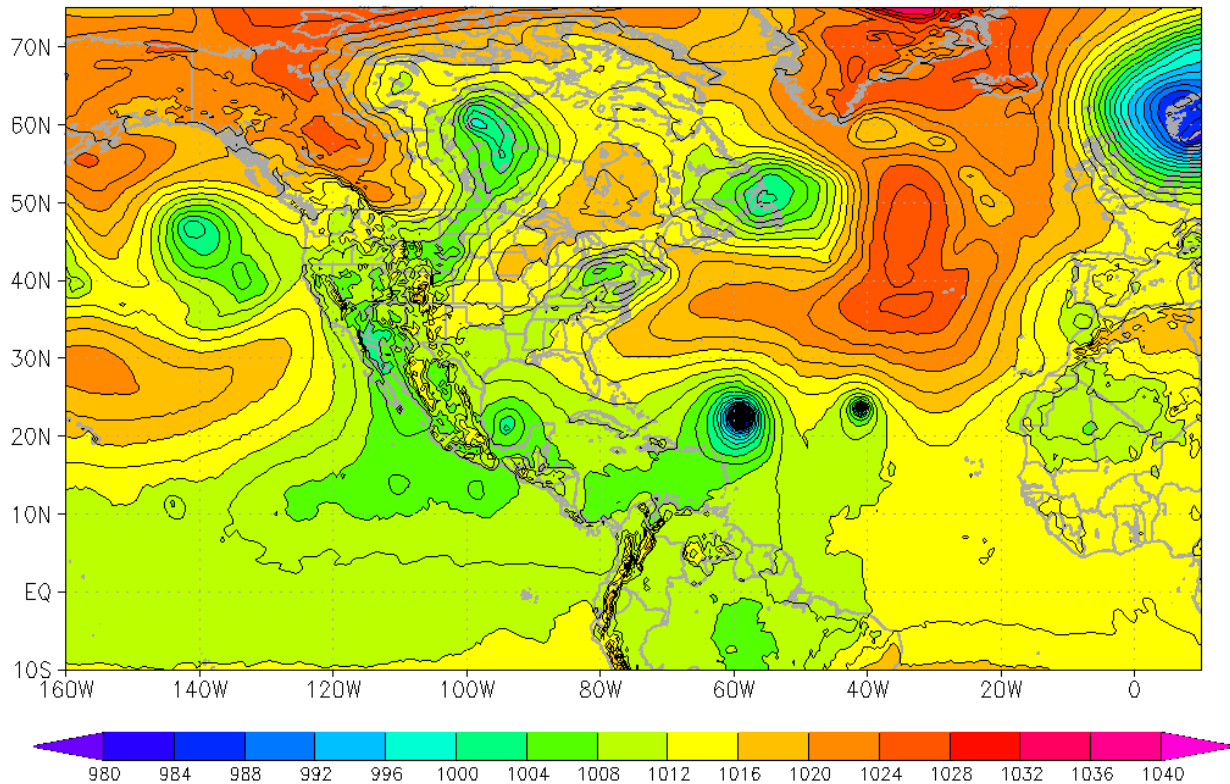
44H

# Atlantic INVEST 92 Model Tracks Valid Time: 0600 UTC 14 September 2010



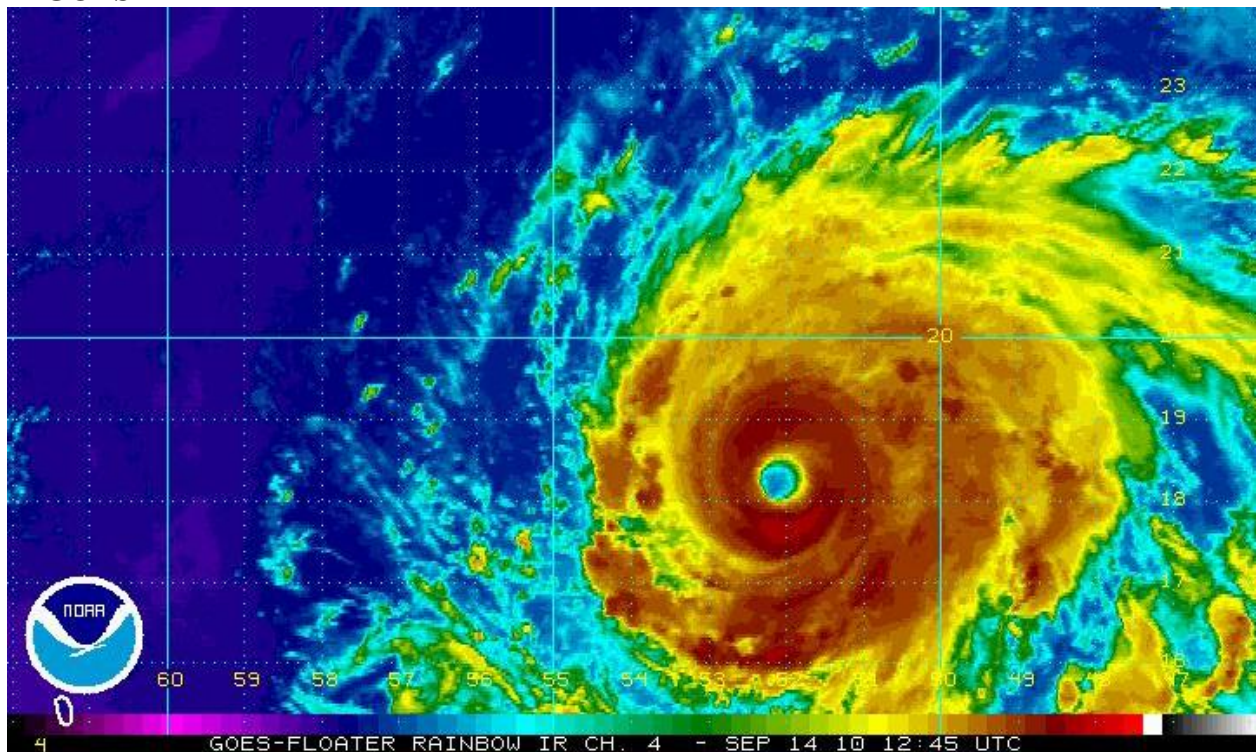
44I

00Z14SEP2010 ecmwf-oper MSLP (mb) T=72 h

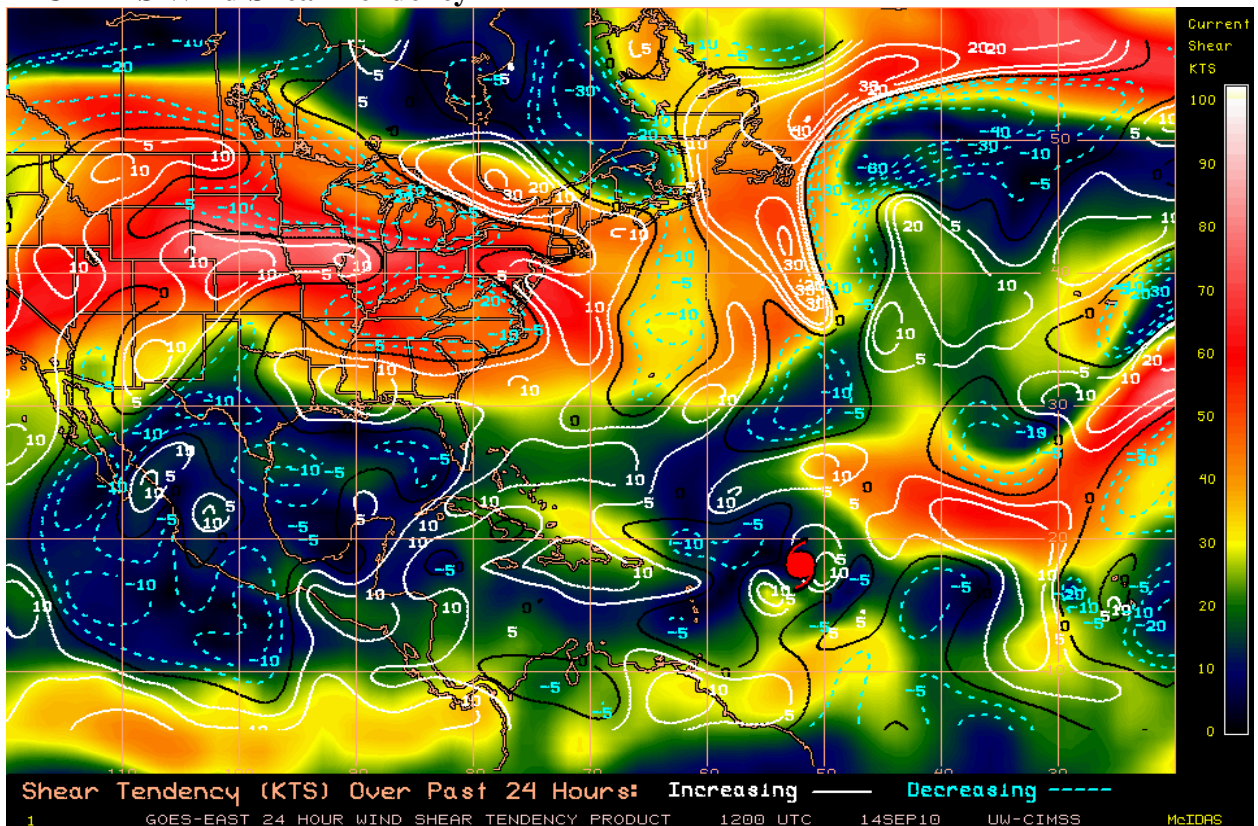


Igor:

**I1 GOES IR**



## I2 CIMMS Wind Shear Tendency



## I3

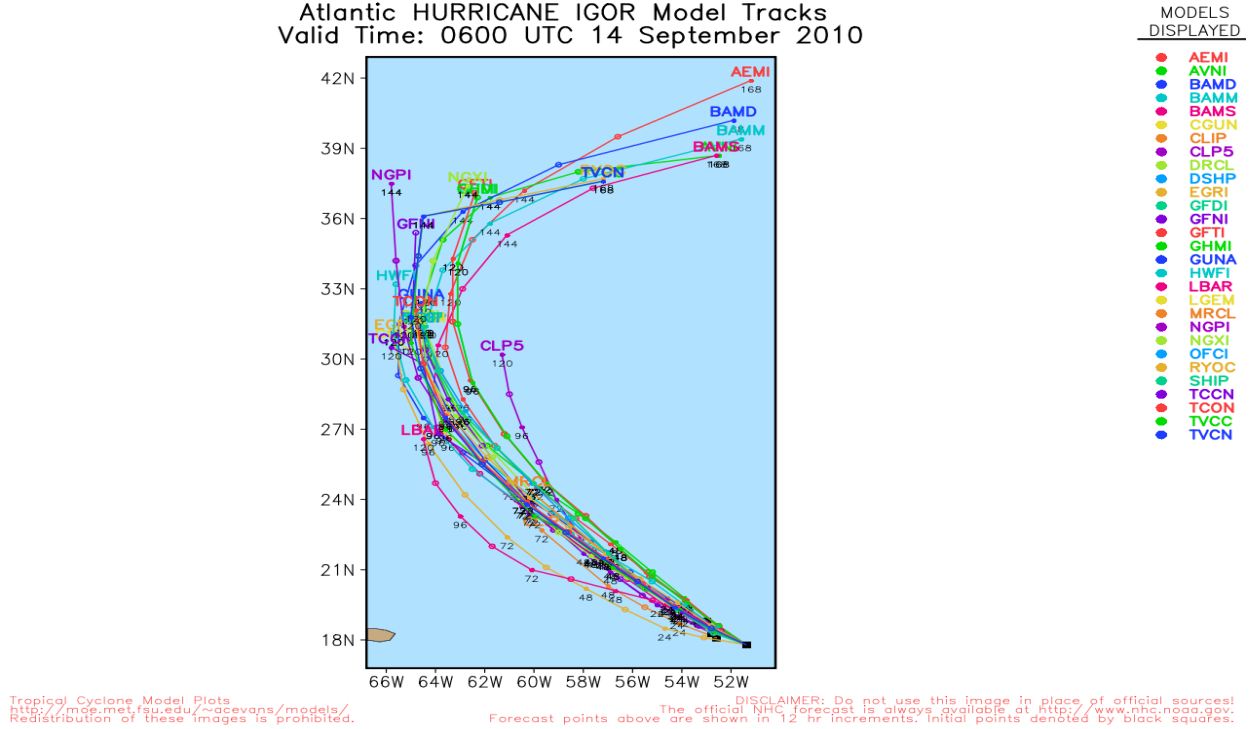
	* ATLANTIC SHIPS INTENSITY FORECAST *												
	* GOES DATA AVAILABLE *												
	* OHC DATA AVAILABLE *												
	* IGOR AL112010 09/14/10 12 UTC *												
TIME (HR)	0	6	12	18	24	36	48	60	72	84	96	108	120
V (KT) NO LAND	115	115	118	120	124	126	127	121	119	113	104	95	88
V (KT) LAND	115	115	118	120	124	126	127	121	119	113	104	95	88
V (KT) LGE mod	115	112	112	112	113	115	114	113	110	103	94	87	80
SHEAR (KT)	1	6	9	5	14	7	5	10	11	19	23	25	30
SHEAR ADJ (KT)	0	1	0	0	-1	-3	0	-2	-2	-1	0	6	2
SHEAR DIR	66	108	138	95	98	121	185	197	252	206	208	200	192
SST (C)	28.7	28.8	28.8	28.9	29.0	29.1	29.0	29.0	29.0	28.5	28.2	28.4	28.2
POT. INT. (KT)	145	147	148	150	151	153	151	152	152	144	139	143	140
ADJ. POT. INT.	134	136	137	139	140	140	138	138	136	127	122	124	120
200 MB T (C)	-50.5	-50.1	-50.5	-49.9	-49.3	-49.1	-48.5	-48.1	-47.9	-47.1	-47.8	-47.7	-46.9
TH_E DEV (C)	12	12	13	13	12	12	10	10	9	10	8	8	7
700-500 MB RH	60	59	56	55	53	57	57	59	56	57	57	55	55
GFS VTEX (KT)	35	41	42	36	42	40	43	43	47	46	45	43	46
850 MB ENV VOR	76	83	92	94	103	128	144	166	162	160	166	155	174
200 MB DIV	61	41	55	61	104	69	58	56	31	25	53	73	76
LAND (KM)	1263	1240	1222	1216	1159	1031	959	902	902	987	1133	1237	1100
LAT (DEG N)	18.1	18.5	18.9	19.5	20.0	21.1	22.4	23.7	25.1	26.7	28.4	30.4	32.6
LONG(DEG W)	52.0	52.7	53.3	54.1	54.8	56.3	57.6	59.2	60.9	62.3	63.3	64.1	64.5
STM SPEED (KT)	6	7	8	9	9	9	9	10	10	10	10	11	11
HEAT CONTENT	67	67	72	68	71	68	65	54	42	26	18	21	22

FORECAST TRACK FROM OFCI INITIAL HEADING/SPEED (DEG/KT):290/ 6 CX,CY: -5/ 2  
T-12 MAX WIND: 125 PRESSURE OF STEERING LEVEL (MB): 540 (MEAN=624)  
GOES IR BRIGHTNESS TEMP. STD DEV. 50-200 KM RAD: 7.6 (MEAN=14.5)  
% GOES IR PIXELS WITH T < -20 C 50-200 KM RAD: 99.0 (MEAN=65.0)



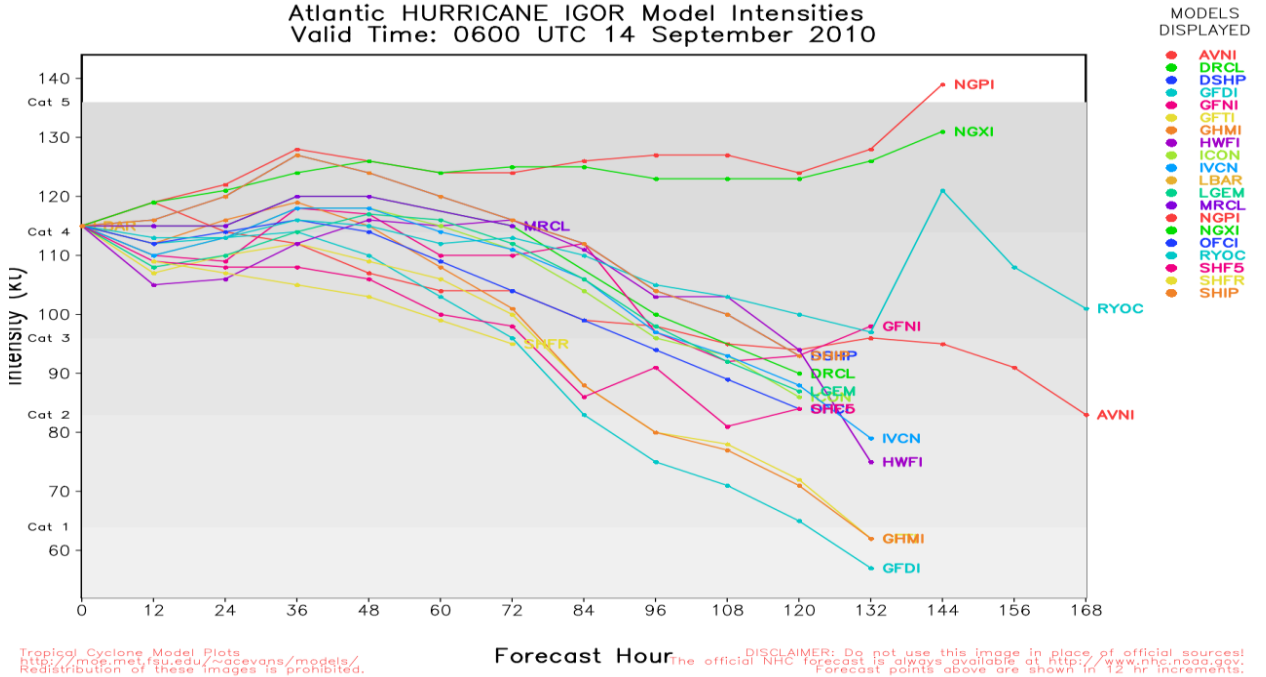
I4

Atlantic HURRICANE IGOR Model Tracks  
Valid Time: 0600 UTC 14 September 2010



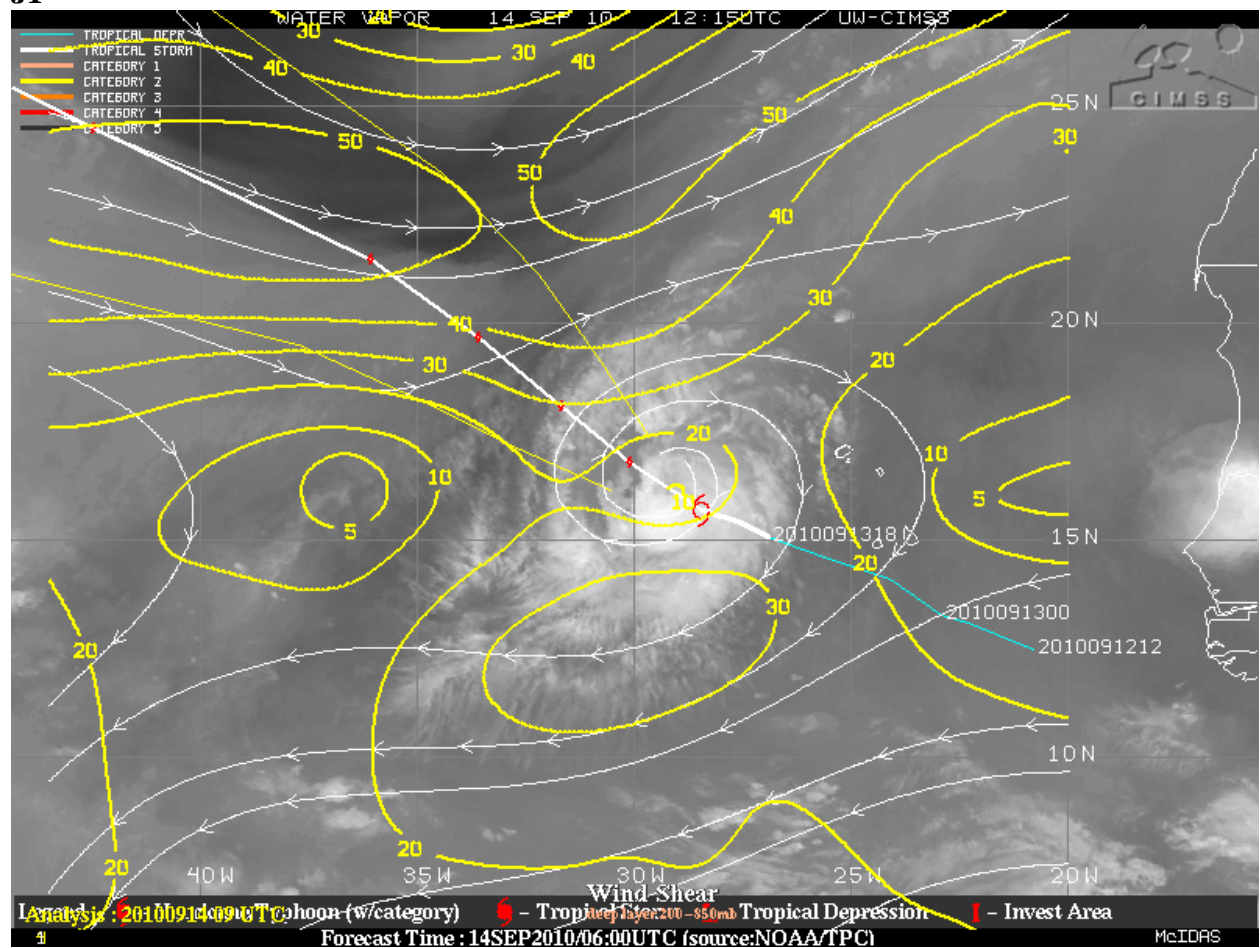
I5

Atlantic HURRICANE IGOR Model Intensities  
Valid Time: 0600 UTC 14 September 2010



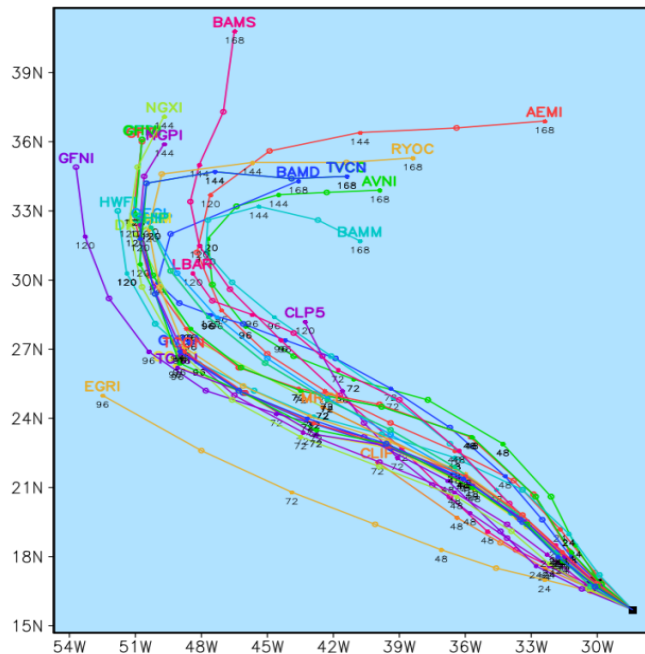
**Julia:**

**J1**



J2

Atlantic TROPICAL STORM JULIA Model Tracks  
Valid Time: 0600 UTC 14 September 2010



MODELS  
DISPLAYED

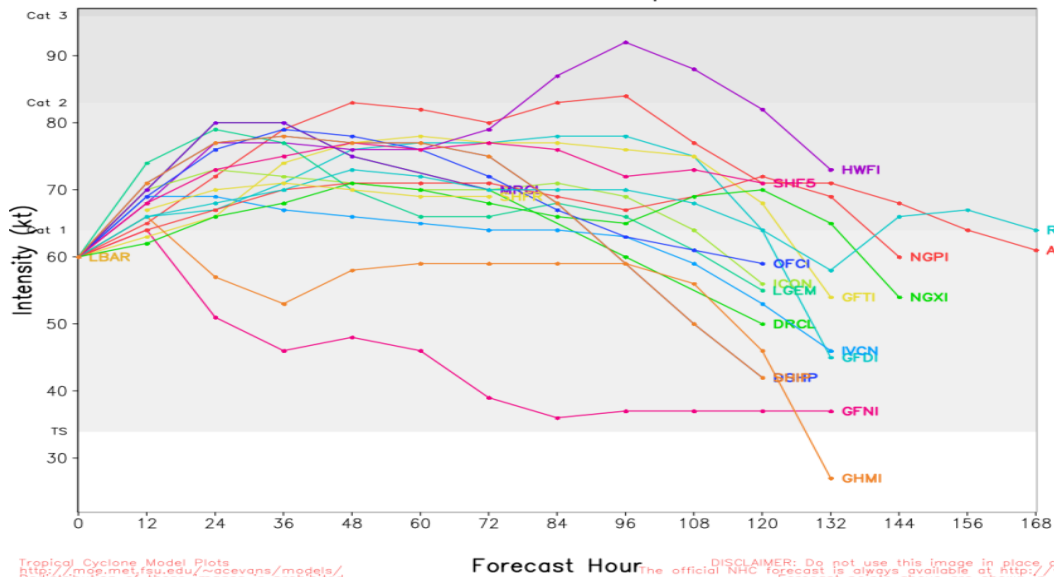
- AEMI
- AVNI
- BAMD
- BAMB
- BAMS
- CGUN
- CLIP
- CLP5
- DRCL
- DSHP
- EGRI
- GFDI
- GFNI
- GHMI
- GUNA
- HWFI
- LBAR
- LGEM
- MRCL
- NGPI
- NGXI
- OFCI
- RYOC
- SHIP
- TCCN
- TCON
- TVCC
- TVCN

Tropical Cyclone Model Plots  
<http://mop.met.fsu.edu/~acevans/models/>  
Redistribution of these images is prohibited.

DISCLAIMER: Do not use this image in place of official sources.  
The official NHC forecast is always available at <http://www.nhc.noaa.gov>.  
Forecast points above are shown in 12 hr increments. Initial points denoted by black squares.

J3

Atlantic TROPICAL STORM JULIA Model Intensities  
Valid Time: 0600 UTC 14 September 2010



MODELS  
DISPLAYED

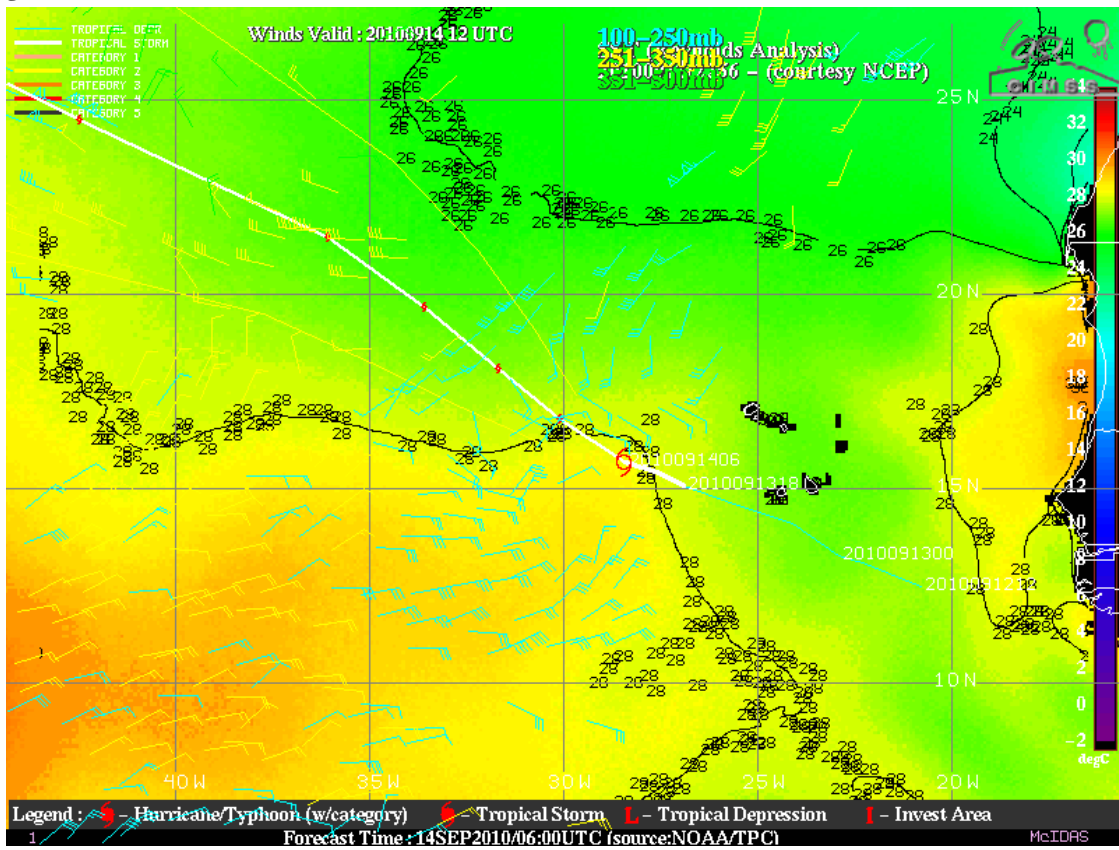
- AVNI
- DRCL
- DSHP
- GFDI
- GFNI
- GFTI
- GHMI
- HWFI
- ICON
- IVON
- LBAR
- LGEM
- MRCL
- NGPI
- NGXI
- OFCI
- RYOC
- SHF5
- SHFR
- SHIP

Tropical Cyclone Model Plots  
<http://mop.met.fsu.edu/~acevans/models/>  
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Forecast Hour  
DISCLAIMER: Do not use this image in place of official sources.  
The official NHC forecast is always available at <http://www.nhc.noaa.gov>.  
Forecast points above are shown in 12 hr increments.

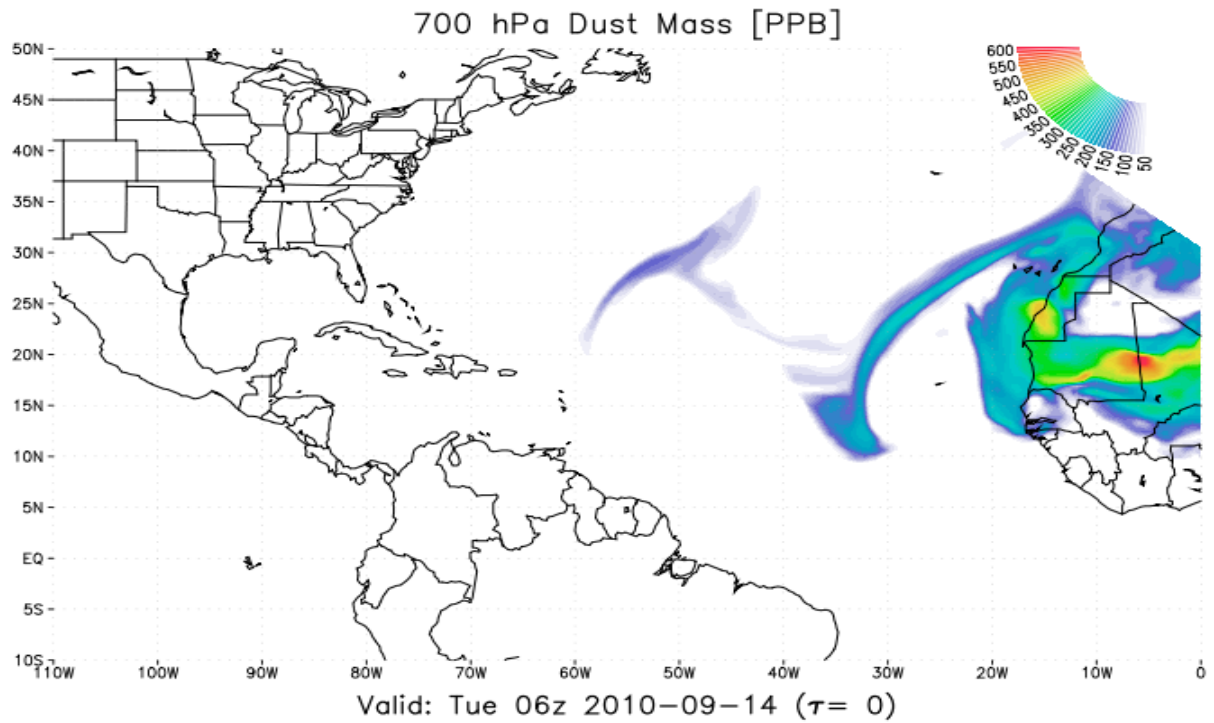


## J4



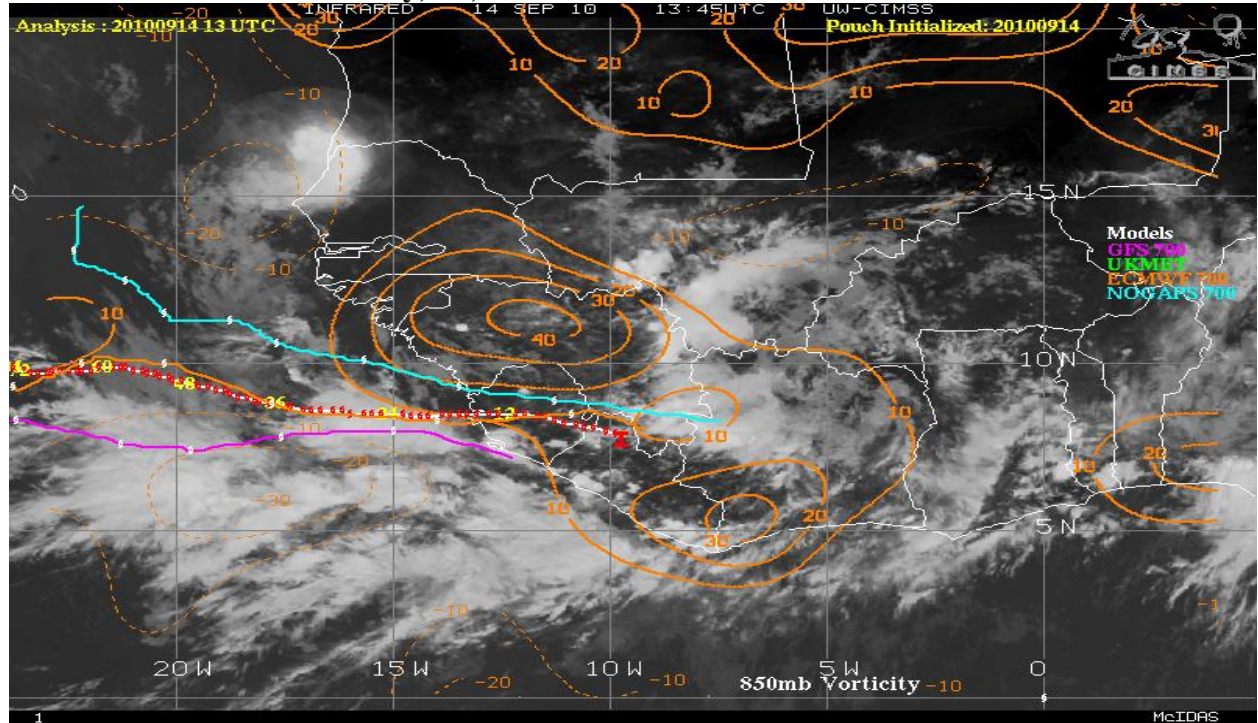
**J5**

NASA/GSFC Global Modeling and Assimilation Office - GEOS-5 Forecast Initialized on 06z 2010-09-14

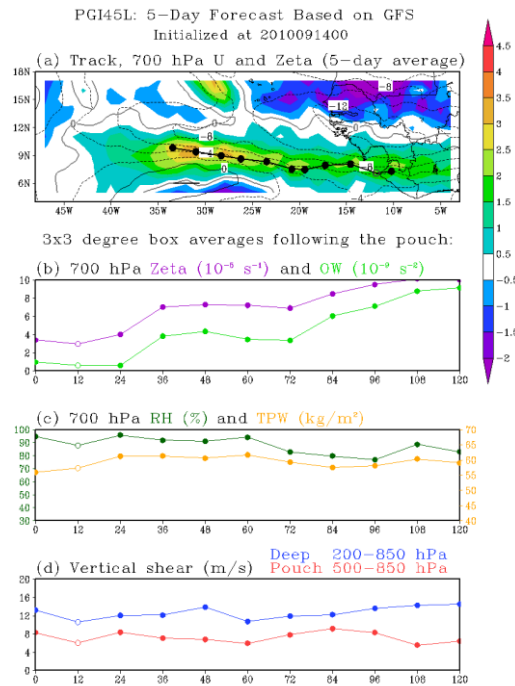
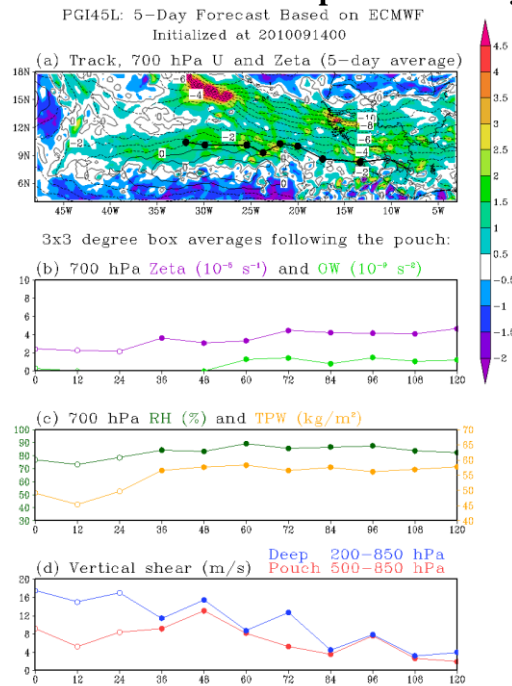


## PGI-45L

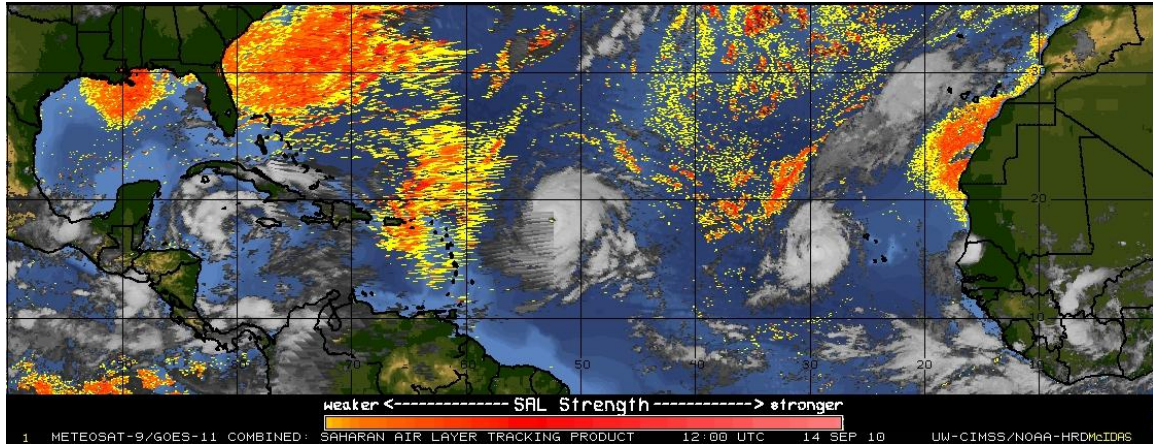
### 45A-CIMMS 850mb Vorticity, IR, and Model Tracks



### 45B ECMWF and GFS pouch tracking

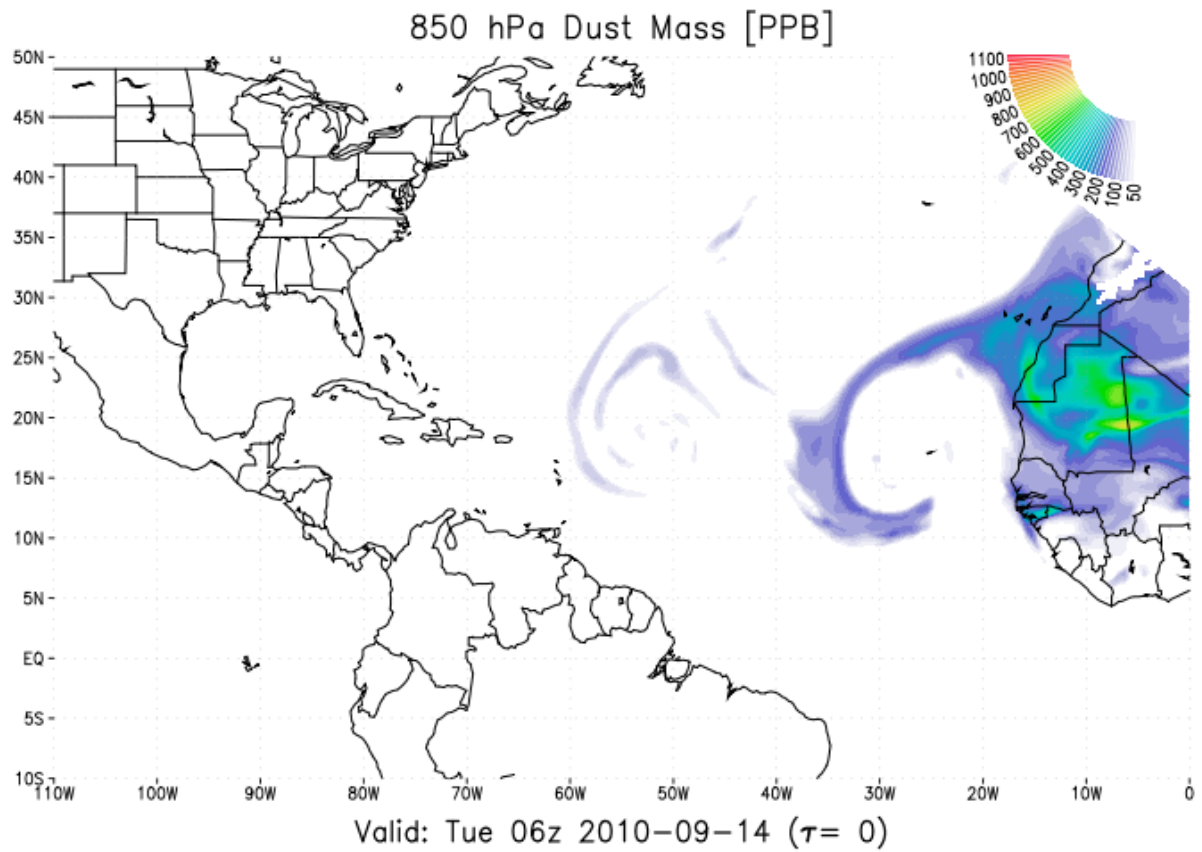


SAL:  
D1



D2

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D3

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